

**2005 Annual Water Quality Report**

*AWO-L6* Council Bluffs C&D Landfill

Council Bluffs, Iowa

Permit No. 78-SDP-04-89P

Project No. ANDEX 05001

November 2005

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**BARKER LEMAR**  
ENGINEERING CONSULTANTS

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QUAD CITIES  
ST. LOUIS  
ROLLA

November 30, 2005

Ms. Amie Hart  
Iowa Department of Natural Resources  
900 E. Grand Avenue  
Wallace State Office Building  
Des Moines, IA 50319

**RE: 2005 Annual Water Quality Report and  
Leachate Control System Performance Evaluation  
Council Bluffs C&D Landfill  
Permit No. 78-SDP-04-89P  
Project No. ANDEX 05001**

Dear Amie:

**BARKER LEMAR ENGINEERING CONSULTANTS (BARKER LEMAR)**, on behalf of the Anderson Excavating Company, has completed the water quality monitoring and assessment for the above-referenced site for the year 2005. Our services were performed in general accordance with Iowa Administrative Code (IAC) Section 114.26(4) and the current requirements for implementation of the Hydrologic Monitoring System Plan (HMSPI). Please find enclosed a copy of the 2005 Annual Water Quality Report and Leachate Control System Performance Evaluation (LCSPE) for the above-referenced site.

If you have any questions regarding this report, please contact us at 515/256-8814.

Sincerely,  
**BARKER LEMAR ENGINEERING CONSULTANTS**



Yuta Naganuma, E.I.  
Staff Engineer

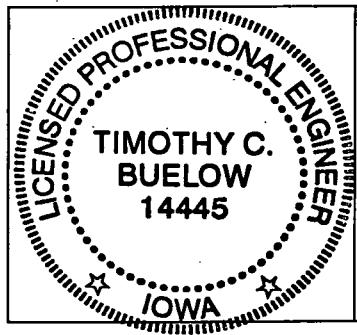
  
Christine L. Collier, E.I.  
Senior Project Manager

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IDNR Field Office #4  
File

**BARKER LEMAR**  
ENGINEERING CONSULTANTS

**2005 ANNUAL WATER QUALITY REPORT &  
LEACHATE CONTROL SYSTEM PERFORMANCE EVALUATION  
COUNCIL BLUFFS C&D LANDFILL  
Council Bluffs, Iowa  
Permit No. 78-SDP-04-89P  
Project No. ANDEX 05001  
November 2005**



I hereby certify that this engineering document was prepared by me or under my direct personal supervision and that I am a duly licensed Professional Engineer under the laws of the State of Iowa.



Date: 11-30-05

Timothy C. Buelow, P.E.

License No. 14445

My license renewal date is December 31, 2005

Pages or sheets covered by this seal:

ALL EXCEPT APPENDIX C

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**BARKER LEMAR**  
ENGINEERING CONSULTANTS

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**2005 ANNUAL WATER QUALITY REPORT AND  
LEACHATE CONTROL SYSTEM PERFORMANCE EVALUATION  
COUNCIL BLUFFS C&D LANDFILL**  
Council Bluffs, Iowa  
Permit No. 78-SDP-04-89P  
Project No. ANDEX 05001  
November 2005

## **1.0 INTRODUCTION**

**BARKER LEMAR ENGINEERING CONSULTANTS (BARKER LEMAR)**, on behalf of our client, Anderson Excavating Company, has completed the required groundwater sampling at the above-referenced site. This report has been prepared in accordance with the requirements of Iowa Administrative Code (IAC) 567-114(455B) and recent additional requirements per March 4, 2005 IDNR correspondence. This report summarizes the 2005 site groundwater monitoring program and provides analysis of the data collected.

### **1.1 BRIEF HISTORY OF THE SITE**

The Anderson Excavating C&D Sanitary Landfill is situated within an old pit, which was abandoned in the 1950's after a failed attempt to obtain sand and gravel. The landfill has been a permitted facility since 1989. The site has actively been receiving waste since that time. The landfill property covers approximately 80 acres, of which approximately 1.9 acres are currently permitted for solid waste disposal.

### **1.2 GEOLOGY OF THE SITE**

The *1995 Hydrogeological Investigation Report for Anderson Excavating and Wrecking Company Construction and Demolition Landfill* prepared by Howard R. Green Company Consulting Engineers provided the following geological description:

*The landfill is located in the "Western Loess Hills," which is characterized by thick wind deposited soil (loess) overlying glacial deposits. The unconsolidated sediments at the site consist of up to 200 feet of Pleistocene sediments, primarily clayey silt to silty clay (loess), showing increasing sand and clay content with depth. The thick loess section has been removed over the central portion of the site during a past failed attempt to locate gravel deposits. The Pennsylvanian*

*bedrock beneath the site consists primarily of limestone and shale with thin coal seams. The elevation of the bedrock ranges from 994.2 to 1002.59 feet, msl.*

### **1.3 HYDROLOGY OF THE SITE**

According to the above-referenced 1995 Hydrogeological Investigation report:

*The uppermost aquifer beneath the site is the water table, which is located within the loess section. The water table elevation ranges from 1086.48 feet on the north side of the site to 1071.32 feet in the southeast corner of the site. Based on in-situ permeability tests, K-values of this loess unit range from  $7.2 \times 10^{-6}$  to  $3.1 \times 10^{-7}$  cm/sec, while transmissivity values range from 0.106 to 0.398 square feet per day.*

*The water table flow direction is primarily toward the southeast and Mosquito Creek. The primary flow direction of the lower screened interval is toward the southwest.*

*Horizontal flow gradients were found to vary from 0.010 to 0.053 in the water table aquifer and from 0.019 to 0.065 in the lower screened interval. The vertical flow gradients between the water table and the basal sand unit are downward (recharge condition) and varied from 0.027 to 0.251.*

*The horizontal flow velocity at the water table varied from  $8.0 \times 10^{-3}$  to  $9.4 \times 10^{-4}$  ft/day. The horizontal flow velocity in the basal sand unit varied from  $9.6 \times 10^{-1}$  to  $8.6 \times 10^{-6}$  ft/day. The recharge flux rate between the water table and the basal sand unit varied 0.0004 ft<sup>3</sup>/day per sq. ft. to 0.0024 ft<sup>3</sup>/day per sq. ft.*

### **1.4 PREVIOUS LAND USE**

The Anderson Excavation Council Bluffs C&D landfill was used as a quarry prior to development as a landfill.

### **1.5 SOLID WASTE STREAMS**

According to the January 21, 2004 Sanitary Disposal Project Permit, the facility is authorized to receive the following waste streams, each under specific conditions and restrictions:

- Solid waste in accordance with the approved Comprehensive Plan
- Construction and demolition (C&D) wastes
- Whole brick for use in the liner system leachate drainage layer
- Asphalt, wood, metal, and rubble for reuse

### **1.6 REPORT CONTENTS**

Sampling was performed in general accordance with Iowa Administrative Code (IAC) Section 114.26(4) and the provisions identified in the landfill permit. This report addresses water quality data collected during the 2005 sampling events and discusses the following items:

- Changes to the groundwater monitoring system since the Fall 2004 Annual Water Quality Report;
- Observations made during the collection of groundwater samples;
- Results of the physical parameters measured during sample collection;
- Changes or maintenance needed in the monitoring system;
- Statistical treatment and evaluation of the chemical data;
- Evaluation of potential groundwater mounding and impacts on monitoring wells;
- Evaluation of upgradient groundwater and surface water monitoring points;
- Evaluation of potential leachate migration as detected at groundwater monitoring wells;
- Evaluation of potential impact of the landfill on surface water quality; and
- Recommendations for future monitoring.

This report also provides a summary listing of analytical data, statistical computation results, graphs of statistical exceptions, and a digital copy of the data.

## **2.0 FIELD ACTIVITIES AND PROCEDURES**

Groundwater monitoring wells were developed and sampled by BARKER LEMAR personnel on April 5, 2005 and October 10, 2005. These activities represent the regular spring and fall semi-annual sampling events for 2005. Water samples from six (6) groundwater monitoring wells were collected during the April and September sampling events. Sampling forms and analytical reports for the April sampling event were submitted previously. Sampling forms for the October sampling event are included in Appendix A.

The general field measurements and sampling procedures used are outlined below:

- Static water levels and total well depths were measured using an electronic water level indicator.
- Groundwater wells were purged of approximately three well volumes or until dry using dedicated Waterra® development/sampling pumps, disposable bailers, and vacuum pumps. Groundwater elevations were measured before and after well development.
- Field measurements of pH, temperature, and specific conductance were collected during groundwater monitoring well development and used as indicators of well conditions prior to sample collection.
- Groundwater samples were collected by using the Waterra® pump, disposable bailers, or a vacuum pump and by transferring the samples into laboratory-prepared containers. Bailers and the vacuum pump were used to facilitate collection of groundwater samples from the deep monitoring wells. The samples collected for dissolved metals analysis were field filtered using 0.45 micron filters.

- Groundwater samples were submitted for laboratory analysis under chain-of-custody procedures. Analysis was performed as indicated in the Hydrologic Monitoring System Plan (HMSP) and IAC 567 Sections 114.26(4)(e) and (f) and the provisions identified in the landfill permit.

### **3.0 MONITORING SYSTEM**

The groundwater monitoring system in-place at the site is comprised of six monitoring wells (MW-2, MW-3, MW-4, MW-9, MW-10, and MW-11). Figure 1 shows the location of the monitoring system points. The function as an upgradient, background, or downgradient sampling location for the groundwater monitoring points is depicted in Figure 1.

#### **3.1 GROUNDWATER MONITORING SYSTEM**

Two groundwater regimes (the water table aquifer and the basal sand aquifer) are monitored by the corresponding monitoring wells, as shown in Table 1.

**TABLE 1. MONITORING WELL NETWORK**

REGIME	MONITORING WELLS
Aquifer 1 (Upper/Surficial)	Upgradient: MW-3 Downgradient: MW-2, MW-9, MW-11
Aquifer 2 (Deep Flow)	Upgradient: MW-4 Downgradient: MW-10

#### **3.2 SURFACE WATER MONITORING POINTS**

No surface water monitoring points are established at the Council Bluffs C&D Landfill.

#### **3.3 LEACHATE PIEZOMETER LOCATIONS**

No leachate piezometers are installed at the Council Bluffs C&D Landfill.

### **4.0 MONITORING SYSTEM PERFORMANCE EVALUATION**

The hydrologic monitoring system was re-evaluated to determine the reliability of the performance of the monitoring well points based on the following tasks.

- The high and low groundwater levels were compared to the well depth/screened interval.
- Water level conditions in the monitoring wells were reviewed to evaluate possible changes in the hydrologic setting/flow paths due to landfilling activities.
- Well depths were measured to evaluate integrity and siltation

- A visual inspection of well integrity was performed during the sampling events.

#### **4.1 WATER LEVEL MEASUREMENTS**

The results of the water level measurements and well depth measurements are shown in Table 2 (Summary of Groundwater Levels and Well Performance) on the next page. The data indicate groundwater elevations ranged from 1059.61 feet (MW-4) to 1082.12 feet (MW-3) above mean sea level (amsl). Comparing the groundwater levels recorded during the last two sampling events, groundwater levels decreased in the six wells from the April to October sampling events. The fluctuations ranged from a decrease of 0.46 feet in MW-2 to a decrease of 1.41 feet in MW-9 and MW-10.

Water levels were observed to be within the screened interval in monitoring wells MW-2, MW-3, MW-9, and MW-11 during sampling events in 2005. Monitoring wells MW-4 and MW-10 were observed to have water levels above the reported top of screen elevations, ranging from 51.99 feet to 59.49 feet above the screen. It should be noted that monitoring wells MW-4 and MW-10 are the deep wells in well nests and are expected to have water levels above the top of screen. Water levels in the monitoring wells have been sufficient to yield groundwater samples from the six monitoring wells during both the April and October 2005 sampling events with the exception of MW-2 in October 2005 sampling event.

#### **4.2 GROUNDWATER FLOW**

Groundwater contours were determined for Aquifer 1 (water table aquifer) using groundwater elevation data collected by **BARKER LEMAR** personnel on October 10, 2005 (Figure 2). The contours, which represent the water table or upper aquifer water level elevations, indicate a general flow direction to the southeast with an approximate gradient of 0.019 ft/ft.

Aquifer 2 (deep flow) groundwater contours were indeterminate for the potentiometric surface due to well abandonments in the northeast portion of the site. A review of historical water level data shows little change throughout the years in monitoring wells MW-4 and MW-10.

#### **4.3 WELL SILTATION**

The monitoring well depths were measured by **BARKER LEMAR** personnel during the April and October sampling events. The well depths were generally within 2.1 feet of the installed depth (Table 2). Well depths for MW-4 and MW-10 were unable to be determined since the depths

**TABLE 2**  
**SUMMARY OF GROUNDWATER LEVELS AND WELL PERFORMANCE**

Anderson Excavating Company  
 Council Bluffs C&D Landfill  
 Council Bluffs, Iowa  
 Permit No. 78-SDP-04-89P  
 Project No. ANDEX 05001

WELL	TOC	TOS	TD	DATUM	April 5, 2005	October 10, 2005
MW-2	1128.28	1075.86	62.4	GROUNDWATER LEVEL	59.53	59.99
				GROUNDWATER ELEVATION	1068.75	1068.29
				MEASURED WELL DEPTH	61.0	60.8
MW-3	1196.12	1087.12	119.0	GROUNDWATER LEVEL	114.00	115.21
				GROUNDWATER ELEVATION	1082.12	1080.91
				MEASURED WELL DEPTH	116.9	118.8
MW-4	1195.65	1001.01	199.6	GROUNDWATER LEVEL	135.15	136.04
				GROUNDWATER ELEVATION	1060.50	1059.61
				MEASURED WELL DEPTH*	200+	150+
MW-9	1153.87	1076.22	92.7	GROUNDWATER LEVEL	78.00	79.41
				GROUNDWATER ELEVATION	1075.87	1074.46
				MEASURED WELL DEPTH	92.8	93.0
MW-10	1167.89	1010.44	167.5	GROUNDWATER LEVEL	104.05	105.46
				GROUNDWATER ELEVATION	1063.84	1062.43
				MEASURED WELL DEPTH*	150 +	150 +
MW-11	1167.84	1080.31	102.5	GROUNDWATER LEVEL	94.6	95.9
				GROUNDWATER ELEVATION	1073.24	1071.94
				MEASURED WELL DEPTH	102.5	102.5

NOTES: All measurements in feet

TOC - Top of casing elevation, reference for water level measurements

TOS - Top of screen elevation

TD - Total depth (as originally reported)

\* Exceeded water level indicator capacity

exceeded the water level indicator capacity. Based on the ability of the dedicated purging system to remove accumulated sediment, it appears unlikely that siltation will adversely impact the groundwater monitoring points at this site.

#### **4.4 SAMPLING POINT OBSERVATIONS**

In general, problems regarding the integrity of the monitoring wells were not noted.

#### **4.5 FREQUENCY OF NON-FLOWING SAMPLING POINTS**

Surface water monitoring is not required at the Council Bluffs C&D Landfill.

#### **4.6 DISCUSSION OF POTENTIAL GROUNDWATER MOUNDING**

There are no piezometers at this site; therefore, this section does not apply.

#### **4.7 DISCUSSION OF UPGRAIDENT MONITORING POINTS**

##### Upgradient Groundwater Monitoring Points

The upgradient monitoring well for the water table aquifer (Aquifer 1) is MW-3. The water table contours as shown on Figure 2 indicate that the groundwater level in MW-3 is at a higher elevation than the groundwater levels within the adjacent portion of the waste boundary. In addition, comparing the water quality data for MW-3 with the downgradient wells, degradation of the groundwater quality due to leachate influence has not been observed. The following is a summary of the upgradient monitoring well for water table aquifer:

Analytical results from upgradient monitoring well for water table aquifer **MW-3** exceeded the upper control limit for chemical oxygen demand (COD) in the October 2005 sampling event. Sampling data is available at this well beginning in April 2000. Dissolved iron, ammonia nitrogen, pH, specific conductance, total organic halogen (TOH), total phenols, and dissolved arsenic concentrations in 2005 were within the ranges previously observed. A new concentration minimum was observed for chloride in the October 2005 sampling event. A new concentration maximum for COD was observed in the October 2005 sampling event. No trends in concentrations were noted in the analytes.

The upgradient monitoring well for the basal sand aquifer (Aquifer 2) is MW-4. The groundwater elevations as shown on Figure 2 indicate that the groundwater level in MW-4 is at a slightly lower elevation than the groundwater levels in the downgradient monitoring well MW-10.

However, groundwater flow direction of the basal sand aquifer (Aquifer 2) has been consistently to the southwest and southeast when the groundwater elevation data have been available to determine the flow directions. Although the groundwater level in MW-4 is at a slightly lower elevation, MW-4 is situated upgradient of MW-10. The following is a summary of the upgradient monitoring well for basal sand aquifer:

Analytical results from upgradient monitoring well for the basal sand aquifer **MW-4** did not exceed the upper control limits in the 2005 sampling events. Sampling data is available at this well beginning in April 2000. COD, chloride, dissolved iron, ammonia nitrogen, pH, specific conductance, TOH, and total phenols concentrations in 2005 were within the ranges previously observed. No new concentration maximums or minimums were observed in the 2005 sampling events. No trends in concentrations were noted in the analytes.

#### **4.8 MONITORING SYSTEM RECOMMENDATIONS**

Hydrologic monitoring at the site has been conducted in accordance with the Hydrologic Monitoring System Plan (HMSP) dated June 30, 1995, and revisions dated August 29, 1995, as submitted by Howard R. Green Company and approved on August 31, 1995 and the approved 1999 Site Development and Operation Addendum Plan, dated August 4, 1999, and Plan Set, dated August 11, 1999 by **BARKER LEMAR**, and the special provisions identified in the landfill permit. No recommendations for modifications to the hydrologic monitoring system are needed as of the date of this report.

#### **5.0 DATA EVALUATION METHODS**

The statistical evaluation of the chemical data was completed in accordance with IAC 567 Section 114.26(6).

#### **5.1 WELL GROUPING**

The groundwater regimes discussed in Section 3.1 were evaluated separately. Upgradient monitoring points were selected from each group for statistical comparison. The selection of upgradient points were based on the hydrogeological assessments performed by others, the measured chemical and physical data, and guidance provided by the IDNR.

## **5.2 CONTROL LIMITS**

Once the groupings were completed, the mean, standard deviation, and control limits were calculated for each of the chemical parameters in the upgradient monitoring points. The control limit represents the limit at which a statistical exceedance beyond the background concentration has occurred. For the purpose of this evaluation, the control limits were defined as the mean of the concentrations for the upgradient monitoring point plus/minus two times the standard deviation for each parameter. The lower control limit was only used for evaluation of pH levels.

## **5.3 METHOD DETECTION LIMITS**

Many of the parameters were observed at concentrations less than the method detection limits (MDLs). The mean, standard deviation, and control limit were computed by utilizing the reporting limit value in the computations (i.e., <0.05 becomes 0.05). In situations where the upgradient monitoring point concentrations were consistently below the MDLs, the standard deviation and control limits were not calculated. It should be noted that in some cases in which control limits were not calculated for the aforementioned reason, the measured downgradient concentration exceeded the upgradient mean.

## **5.4 REGULATORY ACTION LIMITS**

In addition to evaluating the concentration in comparison to upgradient control limits, the concentrations were also compared to current United States Environmental Protection Agency (USEPA) Maximum Contaminant Levels (MCLs), Negligible Risk Levels (NRLs) and Health Advisory Levels (HALs). IDNR guidance documents define the "action level" for groundwater as the following:

*"As defined by 567 - 133.2 (455B, 455E), action level means the HAL, if one exists. If there is no HAL, then the NRL, if one exists. If there is no HAL or NRL, then the MCL. If there is no HAL, NRL, or MCL, an action level may be established by the department based on current technical literature and recommended guidelines of the USEPA and recognized experts, on a case-by-case basis."*

No regulatory action levels were exceeded in the 2005 sampling event at the Council Bluffs C&D Landfill.

## **6.0 EVALUATION OF WATER QUALITY PARAMETERS**

The historical analytical results of the upgradient and downgradient monitoring wells are presented in Appendix B (Summary of Groundwater Chemistry). The analytical data reports for the October 2005 sampling event are included in Appendix C. Parameters were graphed in relation to the current upgradient mean and standard deviation for each group. Results that exceeded the current upgradient control limits are presented in the Exceedance Tables in Appendix D. The graphs depicting the changes of each parameter in each downgradient monitoring point are included in Appendix E. Note that some graphs may depict values that exceed the upper control limit and are not included in the summary of exceedances table. These values are not reported as exceedances due to the upper control limit being less than the detection level of that parameter's test method.

### **6.1 MONITORING WELL SUMMARY**

No statistical exceedances were measured in **MW-2** in the 2005 sampling events. Sampling has been conducted at this well since February 1997. Sufficient water was not present in the monitoring well during the October 2005 sampling event for the collection of laboratory samples. Only field parameters were measured. The chemical oxygen demand (COD), chloride, dissolved iron, ammonia nitrogen, pH, specific conductance, and dissolved arsenic concentrations were within the ranges previously observed. No new concentration maximums or minimums were observed during 2005 sampling events. No trends in concentrations were noted in the analytes.

No statistical exceedances were measured for **MW-9** in the 2005 sampling events. Sampling has been conducted at this well since November 1996. The COD, chloride, dissolved iron, ammonia nitrogen, pH, specific conductance, total phenols, and TOH concentrations were within the ranges previously observed. No new concentration maximums or minimums were observed during the 2005 sampling events. No trends in concentrations were noted in the analytes.

Statistical exceedances were measured in **MW-10** for chloride in the April and October 2005 sampling events. Sampling has been conducted at this well since November 1996. The COD, chloride, dissolved iron, ammonia nitrogen, pH, specific conductance, total phenols, and TOH concentrations were within the ranges previously observed. Specific conductance concentration exceeded the field measurement equipment capacity of 4,000 umhos/cm in the October 2005 sampling event. The same occurrence was observed in the October 2004 sampling event. No

new concentration maximums or minimums were observed during the 2005 sampling events. An erratic but generally increasing chloride concentration trend was noted in data beginning in 1998. No other trends in concentrations were noted in the remaining analytes.

A statistical exceedance was measured in MW-11 for specific conductance in the October 2005 sampling event. Sampling has been conducted at this well since November 1996. The COD, chloride, dissolved iron, ammonia nitrogen, pH, specific conductance, total phenols, and TOH concentrations were within the ranges previously observed. No new concentration maximums or minimums were observed during the 2005 sampling events. No trends in concentrations were noted in the analytes.

## **7.0 SUMMARY AND RECOMMENDATIONS**

### **7.1 POTENTIAL LEACHATE MIGRATION**

A summary of the 2004 and 2005 exceedances computed for the downgradient monitoring wells are shown in Table 3A and 3B.

**TABLE 3A  
2004 SUMMARY OF STATISTICAL EXCEEDANCES**

Parameter	MW-10	MW-11
Chloride	4,10	
Specific Conductance		10

4 = April 2004 Sampling Event  
10 = October 2004 Sampling Event

**TABLE 3B  
2005 SUMMARY OF STATISTICAL EXCEEDANCES**

Parameter	MW-10	MW-11
Chloride	4,10	
Specific Conductance		10

4 = April 2005 Sampling Event  
10 = October 2005 Sampling Event

There were no notable changes in water quality from last year. Statistical exceedances did not change from the 2004 to the 2005 water quality data.

Monitoring well MW-10 indicated a generally increasing trend in chloride beginning in 1998. This data should continue to be reviewed as new data becomes available to determine if the parameter trend observations are consistent.

Overall, concentrations of indicator parameters have revealed relative consistency within the range of previous measurements. A complete analysis of the historical data can be found in Appendix E. Historical trends should be considered during the evaluation of the exceedance values.

In general, it does not appear that leachate migration beyond the waste management boundary is occurring as the number of statistical exceedances were limited and consistent with last year. It was also noted that no regulatory action levels were exceeded in the 2005 sampling events.

## **7.2 POTENTIAL RECEPTORS**

Not applicable as no MCLs were exceeded in the 2005 sampling events.

## **7.3 IMPACT OF THE LANDFILL ON SURFACE WATER QUALITY**

Surface water quality is not monitored at the Council Bluffs C&D Landfill.

## **7.4 CONCLUSIONS AND RECOMMENDATIONS FOR FUTURE MONITORING**

Based on these results, BARKER LEMAR recommends the following items be conducted to continue monitoring the groundwater quality at the site:

- Continue routine semi-annual and annual water sampling for the parameters listed in IAC Chapter 114.26(4)(e) and (f).
- Continue supplemental semiannual sampling and analysis of monitoring well MW-3 for dissolved arsenic.

The additional dissolved arsenic tests will be discontinued upon the following conditions: 1) three consecutive test results show concentrations below the lowest action level (MCL of 0.01 mg/L for dissolved arsenic); 2) the test results and a request for elimination of the additional sampling are submitted to the IDNR; and 3) the IDNR approves discontinuation of the additional sampling.

## 8.0 LEACHATE CONTROL SYSTEM PERFORMANCE EVALUATION

The leachate collection system at the Council Bluffs C&D Landfill consists of three perforated collection pipes that drain into a main header, which empties into a 12,000 gallon storage tank. The main header line runs along the east toe of the Phase I area from the southeast corner of Phase II area to the storage tank. The storage tank will be replaced by a storage lagoon, when needed. In addition, a perforated pipe was added with the main header line. This will provide an extra collection pipe along the east toe of the Phase I area. The leachate that accumulates in the storage tank is pumped from the tank and then re-circulated within the current lined waste area. Table 4 depicts 2005 leachate tank readings obtained from the Leachate Control System Monitoring Sheet for 2005 (Appendix F).

**TABLE 4**  
**2005 LEACHATE TANK READINGS**

Date of Tank Level Checked	Tank Level % Full	Tank Level In Gallons	Leachate Tank Pumping Date	Method of Leachate Treatment (Recirculation or POTW*)
January	80%	9,600	1-14-05	Recirculation
February	10%	1,200		
March	10%	1,200		
April	15%	1,800		
May	60%	7,200		
June	80%	9,600		
July	85%	10,200	7-15-05	Recirculation
August	25%	3,000		
September	80%	9,600		

\* POTW (Publicly Owned Treatment Works)

## 9.0 GENERAL COMMENTS

The analysis and opinions expressed in this report are based upon data obtained from the samples collected at the indicated locations and from any other information discussed in this report. This report does not reflect any variations in subsurface stratigraphy, hydrogeology, or chemical concentrations that may occur between sampling locations or across the site. Actual subsurface conditions may vary and may not become evident without further exploration.

**BARKER LEMAR** has prepared this report for the exclusive use of our client for the specific application to the project discussed. No warranty is expressly stated or implied in this report.

**BARKER LEMAR** has relied upon information furnished by others as noted in the report, and **BARKER LEMAR** accepts no responsibility for any deficiency, misstatements, or inaccuracy in this report as a result of misstatements, omissions, misrepresentations, fraudulent, or inaccurate information or data provided by others.

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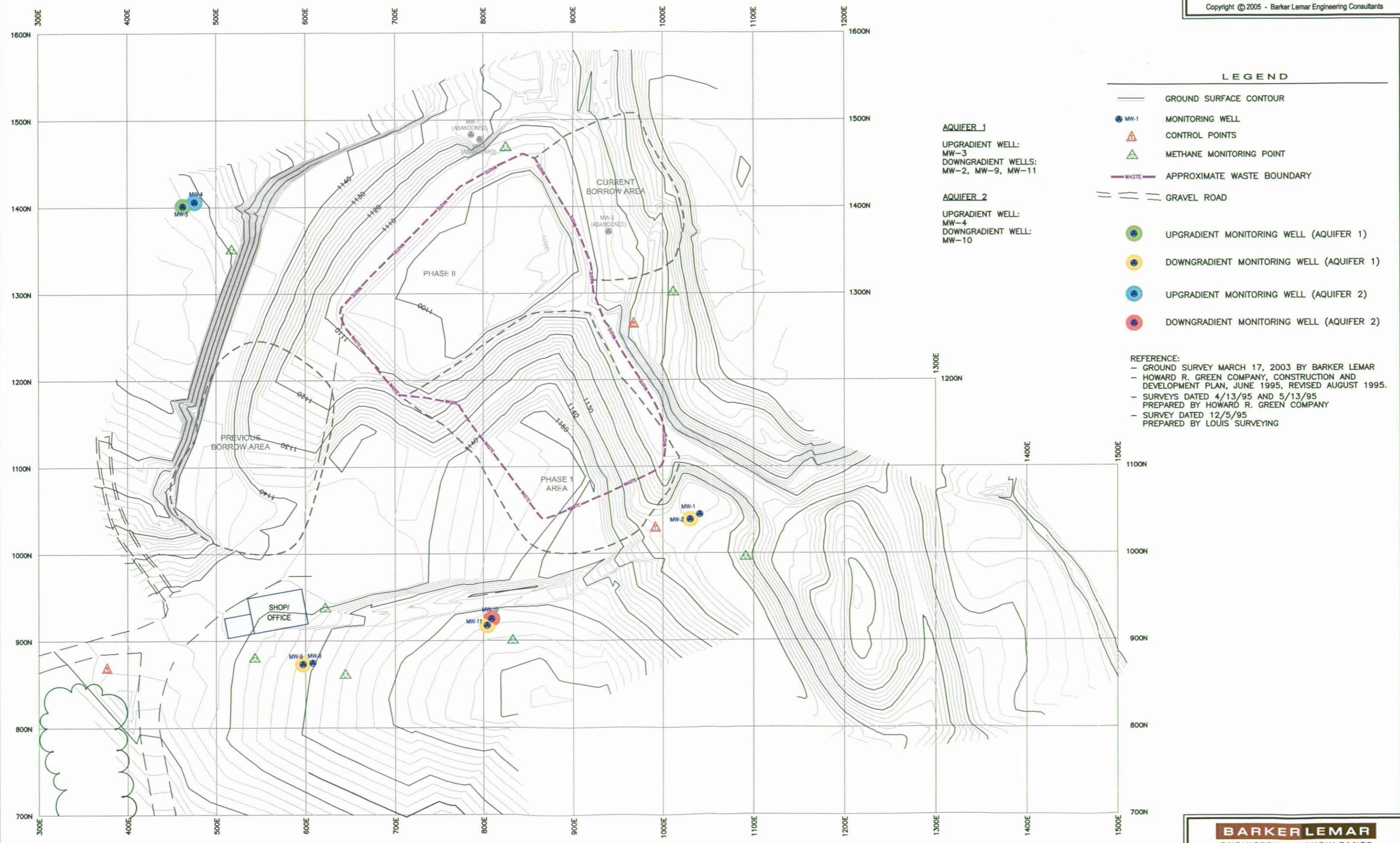
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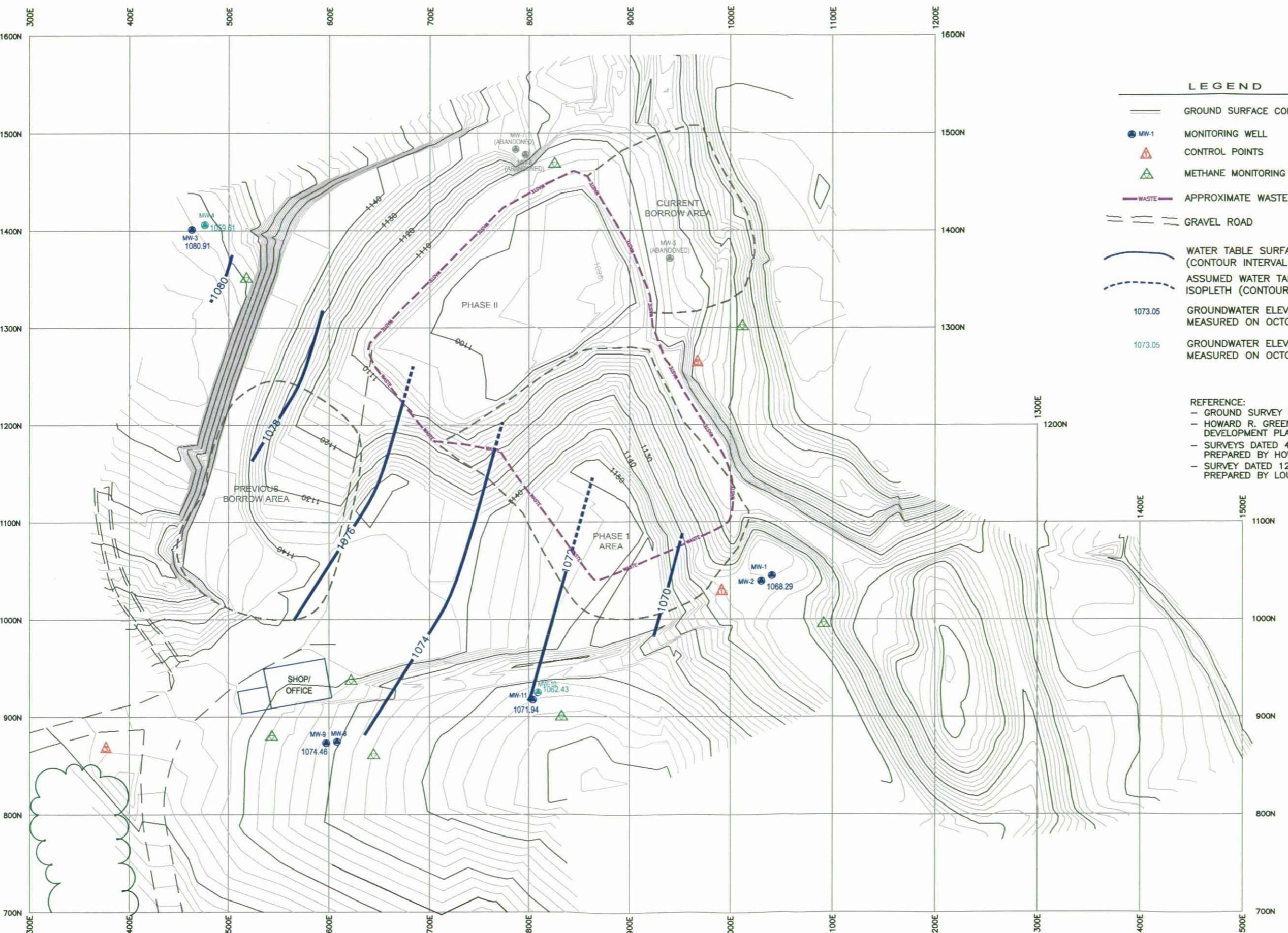
## **FIGURES**

SCALE



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**APPENDIX A**  
**FALL SAMPLING FORMS**

## LANDFILL GROUNDWATER SAMPLING DATA SHEET

**Project Information**

Project Name: Anderson Excavating Co.  
 Project Location: Council Bluffs C&D  
 Project Number: ANDEX 04001  
 SLF Permit No.: 78-SDP-04-89P  
 Weather Conditions: Sunny, calm, 60 degrees Fahrenheit

**Sampling Information**

Date Sampled: 10/10/2005  
 Sampling Crew: Joe Herrick  
 Equipment: Water Level Heron  
 pH/Cond. Hanna

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Well No.	Date	Static Water Level (ft)	Measured Well Depth (ft)	Purging Time at Start of Purging	Purged Volume (gals)	Water Depth After Purging (ft)	Water Depth Before Sampling (ft)	Purging Equipment (See Note 1)	Stabilized pH (SIU)	Stabilized Conductivity (µS/cm)	Stabilized Temperature (°C)	Well Properly Capped? (Y / N)	Little or Standing Water (Y / N)	Comments / Time Sampled
MW-2	10/10/2005	59.99	60.8	NM	NA	NA	NA	W	7.50	1300	14.1	Y	N	Not enough water for analysis
MW-3	10/10/2005	115.21	118.8	11:25 AM	3	Dry	117.12	B	7.51	912	13.2	Y	N	
MW-4	10/10/2005	136.04	150 +	11:50 AM	16	150+	150+	V	7.15	817	15.1	Y	N	
MW-9	10/10/2005	79.41	93.0	11:00 AM	6	90.13	90.13	B	7.30	1304	13.7	Y	N	
MW-10	10/10/2005	105.46	150 +	10:00 AM	18	140.07	140.07	B	7.31	>4000	13.3	Y	N	
MW-11	10/10/2005	95.90	102.5	10:25 AM	3	100.00	100.00	B	7.41	2107	12.9	Y	N	

Note 1: VALID TYPES - Bailer (B), Submersible (S), Waterra (W), Vacuum Pump (V), Dedicated Bailer (DB), Other (describe in comments)

# FORM FOR GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT

Site Name	<u>Anderson Excavating Co.</u>	Permit No.	<u>78-SDP-04-89P</u>
MW/Piezometer No.	<u>MW-2</u>	Upgradient	<u>                  </u>
		Downgradient	<u>X</u>
Name of Person Sampling	<u>Joe Herrick</u>		

## A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Capped?	<u>Yes</u>	Standing Water/Litter?	<u>No</u>
If NO, Explain	<u>                  </u>		

## B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Top of Casing Elevation	<u>1128.28</u>	feet	Ground Elevation (ft.)	<u>1126.86</u>
Drilled Well Depth (ft.)	<u>62.4</u>	feet	Casing Dia. (in.)	<u>4.0</u>
Measured Well Depth (ft.)	<u>60.8</u>	feet		

Equipment Used	<u>Heron</u>		
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Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date	Time	Depth to Groundwater (ft)	Groundwater Elevation
Before Purging	<u>10/10/2005</u>	<u>NM</u>	<u>59.99</u>	<u>1068.29</u>
After Purging	<u>                  </u>	<u>                  </u>	<u>NA</u>	<u>NA</u>
Before Sampling	<u>                  </u>	<u>                  </u>	<u>NA</u>	<u>NA</u>

## C. WELL PURGING

Quantity of Water Removed from Well (gallons)	<u>NA</u>
No. of Well Volumes (based on current water level)	<u>NA</u>
Was well pumped/bailed dry?	<u>NA</u>

Equipment Used:			
Bailer Type	<u>Not Used</u>	Dedicated Bailer?	<u>No</u>
Pump Type	<u>Waterra</u>	Dedicated Pump?	<u>Yes</u>

If not dedicated, method of cleaning                   

## D. FIELD MEASUREMENTS\*

Weather Conditions	<u>Sunny, calm, 60 degrees Fahrenheit</u>		
--------------------	---	--	--

Field Measurements (after stabilization):

Temperature	<u>14.1</u>	Units	<u>Celsius</u>
Equipment Used	<u>Hanna</u>		
pH	<u>7.50</u>	Units	<u>Standard Units</u>
Equipment Used	<u>Hanna</u>		
Spec.Conductance	<u>1300</u>	Units	<u>uS/cm.</u>
Equipment Used	<u>Hanna</u>		

COMMENTS	<u>Not enough water for analysis</u>		
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IDNR Form 542-1322

\* - Omit if only measuring groundwater elevations.

# FORM FOR GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT

Site Name	<u>Anderson Excavating Co.</u>	Permit No.	<u>78-SDP-04-89P</u>
MW/Piezometer No.	<u>MW-3</u>	Upgradient	<u>X</u>
		Downgradient	
Name of Person Sampling	<u>Joe Herrick</u>		

## A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Capped?	<u>Yes</u>	Standing Water/Litter?	<u>No</u>
If NO, Explain	<u>                  </u>		

## B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Top of Casing Elevation	<u>1196.12</u>	feet	Ground Elevation (ft.)	<u>1195.12</u>
Drilled Well Depth (ft.)	<u>119.0</u>	feet	Casing Dia. (in.)	<u>4.0</u>
Measured Well Depth (ft.)	<u>118.8</u>	feet		

Equipment Used	<u>Heron</u>		
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Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date	Time	Depth to Groundwater (ft)	Groundwater Elevation
Before Purging	<u>10/10/2005</u>	<u>11:25 AM</u>	<u>115.21</u>	<u>1080.91</u>
After Purging	<u>                  </u>	<u>                  </u>	<u>Dry</u>	<u>NA</u>
Before Sampling	<u>                  </u>	<u>                  </u>	<u>117.12</u>	<u>1079.00</u>

## C. WELL PURGING

Quantity of Water Removed from Well (gallons)	<u>3</u>
No. of Well Volumes (based on current water level)	<u>1.3</u>
Was well pumped/bailed dry?	<u>Yes</u>

Equipment Used:			
Bailer Type	<u>Bailer</u>	Dedicated Bailer?	<u>No</u>
Pump Type	<u>Not Used</u>	Dedicated Pump?	<u>No</u>

If not dedicated, method of cleaning	<u>disposable bailer</u>
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## D. FIELD MEASUREMENTS

Weather Conditions	<u>Sunny, calm, 60 degrees Fahrenheit</u>		
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Field Measurements (after stabilization):

Temperature	<u>13.2</u>	Units	<u>Celsius</u>
Equipment Used	<u>Hanna</u>		
pH	<u>7.51</u>	Units	<u>Standard Units</u>
Equipment Used	<u>Hanna</u>		
Spec. Conductance	<u>912</u>	Units	<u>uS/cm.</u>
Equipment Used	<u>Hanna</u>		

COMMENTS	<u>                  </u>		
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# FORM FOR GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT

Site Name	<u>Anderson Excavating Co.</u>	Permit No.	<u>78-SDP-04-89P</u>
MW/Piezometer No.	<u>MW-4</u>	Upgradient	<u>X</u>
		Downgradient	
Name of Person Sampling	<u>Joe Herrick</u>		

## A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Capped?	<u>Yes</u>	Standing Water/Litter?	<u>No</u>
If NO, Explain			

## B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Top of Casing Elevation	<u>1195.65</u>	feet	Ground Elevation (ft.)	<u>1194.01</u>
Drilled Well Depth (ft.)	<u>199.6</u>	feet	Casing Dia. (in.)	<u>4.0</u>
Measured Well Depth (ft.)	<u>150 +</u>	feet		

Equipment Used	<u>Heron</u>		
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Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date	Time	Depth to Groundwater (ft)	Groundwater Elevation
Before Purging	<u>10/10/2005</u>	<u>11:50 AM</u>	<u>136.04</u>	<u>1059.61</u>
After Purging	<u>10/10/2005</u>	<u>11:50 AM</u>	<u>150+</u>	<u>NA</u>
Before Sampling	<u>10/10/2005</u>	<u>11:50 AM</u>	<u>150+</u>	<u>NA</u>

## C. WELL PURGING\*

Quantity of Water Removed from Well (gallons)	<u>16</u>
No. of Well Volumes (based on current water level)	<u>0.4</u>
Was well pumped/bailed dry?	<u>No</u>

Equipment Used:			
Bailer Type	<u>Not Used</u>	Dedicated Bailer?	<u>No</u>
Pump Type	<u>Vacuum Pump</u>	Dedicated Pump?	<u>Yes</u>

If not dedicated, method of cleaning \_\_\_\_\_

## D. FIELD MEASUREMENTS\*

Weather Conditions	<u>Sunny, calm, 60 degrees Fahrenheit</u>		
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Field Measurements (after stabilization):

Temperature	<u>15.1</u>	Units	<u>Celsius</u>
Equipment Used	<u>Hanna</u>		
pH	<u>7.15</u>	Units	<u>Standard Units</u>
Equipment Used	<u>Hanna</u>		
Spec. Conductance	<u>817</u>	Units	<u>uS/cm.</u>
Equipment Used	<u>Hanna</u>		

## COMMENTS

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\* - Omit if only measuring groundwater elevations.

# FORM FOR GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT

Site Name	<u>Anderson Excavating Co.</u>	Permit No.	<u>78-SDP-04-89P</u>
MW/Piezometer No.	<u>MW-9</u>	Upgradient	<u></u>
		Downgradient	<u>X</u>
Name of Person Sampling	<u>Joe Herrick</u>		

## A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Capped?	<u>Yes</u>	Standing Water/Litter?	<u>No</u>
If NO, Explain	<u></u>		

## B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Top of Casing Elevation	<u>1153.87</u>	feet	Ground Elevation (ft.)	<u>1151.22</u>
Drilled Well Depth (ft.)	<u>92.7</u>	feet	Casing Dia. (in.)	<u>2.0</u>
Measured Well Depth (ft.)	<u>93.0</u>	feet		

Equipment Used	<u>Heron</u>		
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Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date	Time	Depth to Groundwater (ft)	Groundwater Elevation
Before Purging	<u>10/10/2005</u>	<u>11:00 AM</u>	<u>79.41</u>	<u>1074.46</u>
After Purging	<u></u>	<u></u>	<u>90.13</u>	<u>1063.74</u>
Before Sampling	<u></u>	<u></u>	<u>90.13</u>	<u>1063.74</u>

## C. WELL PURGING

Quantity of Water Removed from Well (gallons)	<u>6</u>
No. of Well Volumes (based on current water level)	<u>2.7</u>
Was well pumped/bailed dry?	<u>No</u>

Equipment Used:			
Bailer Type	<u>Bailer</u>	Dedicated Bailer?	<u>No</u>
Pump Type	<u>Not Used</u>	Dedicated Pump?	<u>No</u>

If not dedicated, method of cleaning	<u>disposable bailer</u>
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## D. FIELD MEASUREMENTS\*

Weather Conditions	<u>Sunny, calm, 60 degrees Fahrenheit</u>		
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Field Measurements (after stabilization):

Temperature	<u>13.7</u>	Units	<u>Celsius</u>
Equipment Used	<u>Hanna</u>		
pH	<u>7.30</u>	Units	<u>Standard Units</u>
Equipment Used	<u>Hanna</u>		
Spec. Conductance	<u>1304</u>	Units	<u>uS/cm.</u>
Equipment Used	<u>Hanna</u>		

## COMMENTS

IDNR Form 542-1322

\* - Omit if only measuring groundwater elevations.

# FORM FOR GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT

Site Name	<u>Anderson Excavating Co.</u>	Permit No.	<u>78-SDP-04-89P</u>
MW/Piezometer No.	<u>MW-10</u>	Upgradient	<u></u>
		Downgradient	<u>X</u>
Name of Person Sampling	<u>Joe Herrick</u>		

## A. MONITORING WELL/PIEZOMETER CONDITIONS

Well/Piezometer Capped?	<u>Yes</u>	Standing Water/Litter?	<u>No</u>
If NO, Explain	<u></u>		

## B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)

Top of Casing Elevation	<u>1167.89</u>	feet	Ground Elevation (ft.)	<u>1165.44</u>
Drilled Well Depth (ft.)	<u>167.5</u>	feet	Casing Dia. (in.)	<u>2.0</u>
Measured Well Depth (ft.)	<u>150 +</u>	feet		

Equipment Used	<u>Heron</u>		
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Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date	Time	Depth to Groundwater (ft)	Groundwater Elevation
Before Purging	<u>10/10/2005</u>	<u>10:00 AM</u>	<u>105.46</u>	<u>1062.43</u>
After Purging	<u></u>	<u></u>	<u>140.07</u>	<u>1027.82</u>
Before Sampling	<u></u>	<u></u>	<u>140.07</u>	<u>1027.82</u>

## C. WELL PURGING

Quantity of Water Removed from Well (gallons)	<u>18</u>
No. of Well Volumes (based on current water level)	<u>1.8</u>
Was well pumped/bailed dry?	<u>No</u>

Equipment Used:			
Bailer Type	<u>Bailer</u>	Dedicated Bailer?	<u>No</u>
Pump Type	<u>Not Used</u>	Dedicated Pump?	<u>No</u>

If not dedicated, method of cleaning	<u>disposable bailer</u>
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## D. FIELD MEASUREMENTS

Weather Conditions	<u>Sunny, calm, 60 degrees Fahrenheit</u>		
--------------------	---	--	--

Field Measurements (after stabilization):

Temperature	<u>13.3</u>	Units	<u>Celsius</u>
Equipment Used	<u>Hanna</u>		
pH	<u>7.31</u>	Units	<u>Standard Units</u>
Equipment Used	<u>Hanna</u>		
Spec. Conductance	<u>&gt;4000</u>	Units	<u>uS/cm.</u>
Equipment Used	<u>Hanna</u>		

## COMMENTS

IDNR Form 542-1322

\* - Omit if only measuring groundwater elevations.

**FORM FOR GROUNDWATER SAMPLING AND/OR GROUNDWATER ELEVATION MEASUREMENT**

Site Name	<u>Anderson Excavating Co.</u>	Permit No.	<u>78-SDP-04-89P</u>
MW/Piezometer No.	<u>MW-11</u>	Upgradient	<u></u>
		Downgradient	<u>X</u>
Name of Person Sampling	<u>Joe Herrick</u>		

**A. MONITORING WELL/PIEZOMETER CONDITIONS**

Well/Piezometer Capped?	<u>Yes</u>	Standing Water/Litter?	<u>No</u>
If NO, Explain	<u></u>		

**B. GROUNDWATER ELEVATION MEASUREMENT (+/- 0.01 foot, MSL)**

Top of Casing Elevation	<u>1167.84</u>	feet	Ground Elevation (ft.)	<u>1165.31</u>
Drilled Well Depth (ft.)	<u>102.5</u>	feet	Casing Dia. (in.)	<u>2.0</u>
Measured Well Depth (ft.)	<u>102.5</u>	feet		
Equipment Used	<u>Heron</u>			

Groundwater Level (+/- 0.01 foot below top of inner casing, MSL):

	Date	Time	Depth to Groundwater (ft)	Groundwater Elevation
Before Purging	<u>10/10/2005</u>	<u>10:25 AM</u>	<u>95.90</u>	<u>1071.94</u>
After Purging	<u></u>	<u></u>	<u>100.00</u>	<u>1067.84</u>
Before Sampling	<u></u>	<u></u>	<u>100.00</u>	<u>1067.84</u>

**C. WELL PURGING**

Quantity of Water Removed from Well (gallons)	<u>3</u>
No. of Well Volumes (based on current water level)	<u>2.8</u>
Was well pumped/bailed dry?	<u>No</u>

Equipment Used:			
Bailer Type	<u>Bailer</u>	Dedicated Bailer?	<u>No</u>
Pump Type	<u>Not Used</u>	Dedicated Pump?	<u>No</u>
If not dedicated, method of cleaning	<u>disposable bailer</u>		

**D. FIELD MEASUREMENTS**

Weather Conditions	<u>Sunny, calm, 60 degrees Fahrenheit</u>		
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Field Measurements (after stabilization):

Temperature	<u>12.9</u>	Units	<u>Celsius</u>
Equipment Used	<u>Hanna</u>		
pH	<u>7.41</u>	Units	<u>Standard Units</u>
Equipment Used	<u>Hanna</u>		
Spec. Conductance	<u>2107</u>	Units	<u>uS/cm.</u>
Equipment Used	<u>Hanna</u>		

**COMMENTS**

IDNR Form 542-1322

\* - Omit if only measuring groundwater elevations.

**APPENDIX B**  
**SUMMARY OF GROUNDWATER CHEMISTRY**









## Summary of Groundwater Chemistry

Council Bluffs Construction and Demolition Landfill - 78-SDP-04-89P

Parameter	Date	MW-2	MW-3	MW-4	MW-5	MW-7	MW-9	MW-10	MW-11
		DN1	UP1	UP2	UP1	UP2	DN1	DN2	DN1
Lead, Dissolved - mg/L MCL - 0.015 mg/L	11/8/1996	NM	NM	NM	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	2/27/1997	<0.0050	NM	NM	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	5/12/1997	NM	NM	NM	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	7/23/1997	NM	NM	NM	<0.0040	<0.0040	<0.0040	<0.0040	<0.0040
	4/7/1998	<0.0040	NM	NM	NM	NM	NM	NM	NM
	10/16/1998	<0.0040	NM	NM	NM	NM	NM	NM	NM
	4/16/1999	<0.0040	NM	NM	NM	NM	NM	NM	NM
	10/7/1999	<0.0040	NM	NM	NM	NM	NM	NM	NM
Magnesium, Dissolved - mg/L	11/8/1996	NM	NM	NM	64.0	22.0	38.0	22.0	29.0
	2/27/1997	45.0	NM	NM	75.0	24.0	39.0	25.0	28.0
	5/12/1997	NM	NM	NM	71.0	23.0	38.0	21.0	29.0
	7/23/1997	NM	NM	NM	69.0	22.0	37.0	22.0	27.0
	4/7/1998	34.0	NM	NM	NM	NM	NM	NM	NM
	10/16/1998	30.0	NM	NM	NM	NM	NM	NM	NM
	4/16/1999	42.0	NM	NM	NM	NM	NM	NM	NM
	10/7/1999	56.0	NM	NM	NM	NM	NM	NM	NM
Mercury, Dissolved - mg/L MCL - 0.002 mg/L HAL - 0.002 mg/L	11/8/1996	NM	NM	NM	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	2/27/1997	<0.0002	NM	NM	<0.0002	0.0007	0.0007	0.0008	0.0008
	5/12/1997	NM	NM	NM	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	7/23/1997	NM	NM	NM	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002
	4/7/1998	<0.0002	NM	NM	NM	NM	NM	NM	NM
	10/16/1998	<0.0002	NM	NM	NM	NM	NM	NM	NM
	4/16/1999	<0.0002	NM	NM	NM	NM	NM	NM	NM
	10/7/1999	<0.0002	NM	NM	NM	NM	NM	NM	NM
Zinc, Dissolved - mg/L HAL - 2 mg/L	11/8/1996	NM	NM	NM	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200
	2/27/1997	<0.0200	NM	NM	<0.0200	<0.0200	<0.0200	<0.0200	<0.0200
	5/12/1997	NM	NM	NM	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
	7/23/1997	NM	NM	NM	0.0710	<0.0200	<0.0200	<0.0200	<0.0200
	4/7/1998	<0.0200	NM	NM	NM	NM	NM	NM	NM
	10/16/1998	<0.0200	NM	NM	NM	NM	NM	NM	NM
	4/16/1999	<0.0200	NM	NM	NM	NM	NM	NM	NM
	10/7/1999	0.1450	NM	NM	NM	NM	NM	NM	NM

Notes:

NM - Indicates parameter was not measured

< - Indicates less than the Method Detection Limit (MDL)

ug/L - Indicates micrograms per liter, equivalent to parts per billion at low concentrations

mg/L - Indicates milligrams per liter, equivalent to parts per million at low concentrations

HAL - Indicates United States Environmental Protection Agency Health Advisory Level

NRL - Indicates United States Environmental Protection Agency Negligible Risk Level for Carcinogens

MCL - Indicates United States Environmental Protection Agency Maximum Contaminant Level

Sampling performed over multiple dates is recorded on the first date sampled. Refer to field forms for exact sample date.

**APPENDIX C**  
**FALL ANALYTICAL DATA**

## ANALYTICAL REPORT

Yuta Nagunama  
BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

TestAmerica Job: 05.13980

Project Number: ANDEX 05001  
Project: AEW-Council Bluffs C&D Landfill

Enclosed is the Analytical Reports for the following samples submitted to the Cedar Falls Division of TestAmerica Analytical Testing Corporation for analysis.

Sample Number	Sample Description	Date Taken	Date Received
892629	MW-3	10/10/2005	10/12/2005
892630	MW-4	10/10/2005	10/12/2005
892631	MW-9	10/10/2005	10/12/2005
892632	MW-10	10/10/2005	10/12/2005
892633	MW-11	10/10/2005	10/12/2005

TestAmerica Analytical Testing Corporation certifies that the analytical results contained herein apply only to the specific samples analyzed.

Reproduction of this analytical report is permitted only in its entirety.



Kristin Clay  
Inorganics Operations Manager

## ANALYTICAL REPORT

Yuta Nagunama  
BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Sample No.: 892629

Job No: 05.13980

Sample ID: MW-3  
ANDERSON E & W - COUNCIL BLUFFS C&D LANDFILL  
ANDEX 05001

Date Taken:	10/10/2005	Date Received: 10/12/2005						Analysis	Method
		Result	Units	Flags	Quantitation Limit	Date Analyzed	Time Analyzed		
Chloride, FIA	19.4	mg/L			5.0	10/14/2005	13:06	jcf	SM 4500-C1 E
COD, LL	12	mg/L			5.0	10/18/2005		jcf	SM 5220 D
Ammonia Nitrogen FIA	<0.20	mg/L			0.20	10/19/2005	13:04	jcf	EPA 350.1
Phenols, Total(FIA)	<0.020	mg/L			0.020	10/20/2005	16:26	lbb	EPA 420.2
Total Organic Halogens	<0.010	mg/L Cl-			0.010	10/19/2005		sas	SW 9020B
Dissolved ICP Metals	COMPLETE					10/17/2005		llw	
Iron, Diss (ICP)	<0.10	mg/L			0.10	10/17/2005		llw	SW 6010B
Arsenic, Diss (GFAA)	<0.0010	mg/L			0.0010	10/19/2005		heh	SW 7060A

Key to Flags:

## ANALYTICAL REPORT

Yuta Nagunama  
BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Sample No.: 892630

Job No: 05.13980

Sample ID: MW-4

ANDERSON E & W - COUNCIL BLUFFS C&D LANDFILL  
ANDEX 05001

Date Taken:	10/10/2005	Date Received: 10/12/2005		Quantitation	Date	Time	Analysis	
		Result	Units	Flags	Limit	Analyzed	Analyst	Method
Chloride, FIA	8.1	mg/L			5.0	10/14/2005	13:06	jcf SM 4500-Cl E
COD, LL	<5.0	mg/L			5.0	10/18/2005		jcf SM 5220 D
Ammonia Nitrogen FIA	<0.20	mg/L			0.20	10/19/2005	13:05	jcf EPA 350.1
Phenols, Total (FIA)	<0.020	mg/L			0.020	10/20/2005	16:27	lbb EPA 420.2
Total Organic Halogens	<0.010	mg/L Cl-			0.010	10/19/2005		sas SW 9020B
Dissolved ICP Metals	COMPLETE					10/17/2005		llw
Iron, Diss (ICP)	<0.10	mg/L			0.10	10/17/2005		llw SW 6010B

Key to Flags:

## ANALYTICAL REPORT

Yuta Nagunama  
BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Sample No.: 892631

Job No: 05.13980

Sample ID: MW-9  
ANDERSON E & W - COUNCIL BLUFFS C&D LANDFILL  
ANDEX 05001

Date Taken:	10/10/2005	Date Received: 10/12/2005		Quantitation	Date	Time	Analysis		
		Result	Units	Flags	Limit	Analyzed	Analyzed	Analyst	Method
Chloride, FIA	13.3	mg/L			5.0	10/14/2005	13:07	jcf	SM 4500-Cl E
COD, LL	<5.0	mg/L			5.0	10/18/2005		jcf	SM 5220 D
Ammonia Nitrogen FIA	<0.20	mg/L			0.20	10/19/2005	13:10	jcf	EPA 350.1
Phenols, Total(FIA)	<0.020	mg/L			0.020	10/20/2005	16:49	lbb	EPA 420.2
Total Organic Halogens	<0.010	mg/L Cl-			0.010	10/19/2005		sas	SW 9020B
Dissolved ICP Metals	COMPLETE							llw	
Iron, Diss (ICP)	<0.10	mg/L			0.10	10/17/2005		llw	SW 6010B

Key to Flags:

## ANALYTICAL REPORT

Yuta Nagunama  
BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Sample No.: 892632

Job No: 05.13980

Sample ID: MW-10  
ANDERSON E & W - COUNCIL BLUFFS C&D LANDFILL  
ANDEX 05001

Date Taken:	10/10/2005	Date Received:		10/12/2005	Quantitation	Date	Time	Analysis	
		Result	Units	Flags	Limit	Analyzed	Analyzed	Analyst	Method
Chloride, FIA	42.2	mg/L			5.0	10/14/2005	13:08	jcf	SM 4500-Cl E
COD, LL	<5.0	mg/L			5.0	10/18/2005		jcf	SM 5220 D
Ammonia Nitrogen FIA	<0.20	mg/L			0.20	10/19/2005	13:11	jcf	EPA 350.1
Phenols, Total (FIA)	<0.020	mg/L			0.020	10/20/2005	16:52	lbb	EPA 420.2
Total Organic Halogens	<0.010	mg/L Cl-			0.010	10/19/2005		sas	SW 9020B
Dissolved ICP Metals	COMPLETE						10/17/2005	llw	
Iron, Diss (ICP)	<0.10	mg/L			0.10	10/17/2005		llw	SW 6010B

Key to Flags:

## ANALYTICAL REPORT

Yuta Nagunama  
BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Sample No.: 892633

Job No: 05.13980

Sample ID: MW-11  
ANDERSON E & W - COUNCIL BLUFFS C&D LANDFILL  
ANDEX 05001

Date Taken:	10/10/2005	Date Received: 10/12/2005		Quantitation	Date	Time	Analysis	
		Result	Units	Flags	Limit	Analyzed	Analyst	Method
Chloride, FIA	8.6	mg/L			5.0	10/14/2005	13:08	jcf SM 4500-Cl E
COD, LL	<5.0	mg/L			5.0	10/18/2005		jcf SM 5220 D
Ammonia Nitrogen FIA	<0.20	mg/L			0.20	10/19/2005	13:12	jcf EPA 350.1
Phenols, Total (FIA)	<0.020	mg/L			0.020	10/20/2005	16:52	lbb EPA 420.2
Total Organic Halogens	<0.010	mg/L Cl-			0.010	10/19/2005		sas SW 9020B
Dissolved ICP Metals	COMPLETE					10/17/2005		llw
Iron, Diss (ICP)	<0.10	mg/L			0.10	10/17/2005		llw SW 6010B

Key to Flags:

## QUALITY CONTROL REPORT

BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Job Number: 05.13980

Yuta Nagunama

Enclosed is the Quality Control data for the following samples submitted to TestAmerica, Inc. - Cedar Falls for analysis:

Sample Number	Sample Description	Date Taken	Date Received
892629	MW-3	10/10/2005	10/12/2005
892630	MW-4	10/10/2005	10/12/2005
892631	MW-9	10/10/2005	10/12/2005
892632	MW-10	10/10/2005	10/12/2005
892633	MW-11	10/10/2005	10/12/2005

This Quality Control report is generated on a batch basis. All information contained in this report is for the analytical batch(es) in which your sample(s) were analyzed.

## QUALITY CONTROL REPORT BLANKS

BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Yuta Nagunama

Job Number: 05.13980

Analyte	Prep	Run			
	Batch	Batch	Blank	Date	
	Number	Number	Analysis	Units	Analyzed
Chloride, FIA		1312	<5.0	mg/L	10/14/2005 jcf
COD, LL		794	<5.0	mg/L	10/18/2005 jcf
Ammonia Nitrogen FIA		715	<0.20	mg/L	10/19/2005 jcf
Ammonia Nitrogen FIA		716	<0.20	mg/L	10/19/2005 jcf
Phenols, Total(FIA)		1632	<0.020	mg/L	10/20/2005 lbb
Phenols, Total(FIA)		1633	<0.020	mg/L	10/20/2005 lbb
Total Organic Halogens		1412	<0.010	mg/L	10/18/2005 jmh
Total Organic Halogens		1412	<0.010	mg/L	10/19/2005 sas
Total Organic Halogens		1412	<0.010	mg/L	10/20/2005 sas
Dissolved ICP Metals		1982	COMPLETE		10/17/2005 llw
Iron, Diss (ICP)		1928	<0.10	mg/L	10/17/2005 llw
Arsenic, Diss (GFAA)		1124	<0.0010	mg/L	10/19/2005 heh

NA - Not Applicable

Advisory Control Limits for Blanks:

All compounds should be less than the quantitation limit.

## QUALITY CONTROL REPORT STANDARDS

BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Yuta Nagunama

Job Number: 05.13980

Analyte	Prep	Run			Analyst
	Batch	Batch	CCV	LCS	
	Number	Number	% Recovery	% Recovery	
Chloride, FIA		1312	103.6		
Chloride, FIA		1312	105.4		
Chloride, FIA		1312	101.5		
Chloride, FIA		1312	103.0		
COD, LL		794	98.4		
COD, LL		794	96.4		
COD, LL		794	99.3		
COD, LL		794	98.5		
Ammonia Nitrogen FIA		715	107.0		
Ammonia Nitrogen FIA		715	104.6		
Ammonia Nitrogen FIA		715	104.0		
Ammonia Nitrogen FIA		715	104.0		
Ammonia Nitrogen FIA		716	103.0		
Ammonia Nitrogen FIA		716	103.8		
Ammonia Nitrogen FIA		716	103.2		
Ammonia Nitrogen FIA		716	104.0		
Ammonia Nitrogen FIA		716	104.0		
Ammonia Nitrogen FIA		716	102.7		
Phenols, Total(FIA)		1632	102.0	102.0	lbb
Phenols, Total(FIA)		1632	102.0		
Phenols, Total(FIA)		1632	101.0		
Phenols, Total(FIA)		1632	103.6		
Phenols, Total(FIA)		1632	102.6		
Phenols, Total(FIA)		1632	102.4		
Phenols, Total(FIA)		1633	101.0	100.0	lbb
Phenols, Total(FIA)		1633	101.0		
Phenois, Total(FIA)		1633	100.0		
Phenols, Total(FIA)		1633	104.8		
Phenols, Total(FIA)		1633	104.6		
Phenols, Total(FIA)		1633	105.2		
Total Organic Halogens		1412	98.4	120.0	jmh

CCV - Continuing Calibration Verification

LCS - Laboratory Control Standard

NA - Not Applicable

## QUALITY CONTROL REPORT STANDARDS

BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Yuta Nagunama

Job Number: 05.13980

Analyte	Prep	Run			Analyst
	Batch	Batch	CCV	LCS	
	Number	Number	% Recovery	% Recovery	
Total Organic Halogens		1412	104.0		
Total Organic Halogens		1412	88.4		
Dissolved ICP Metals		1982	100.0		
Iron, Diss (ICP)		1928	103.2		
Iron, Diss (ICP)		1928	100.8		
Arsenic, Diss (GFAA)		1124	105.9		

CCV - Continuing Calibration Verification

LCS - Laboratory Control Standard

NA - Not Applicable

## QUALITY CONTROL REPORT MATRIX SPIKE

Yuta Nagunama  
BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Job Number: 05.13980

Analyte	Prep	Run	Conc.		Conc.	MS	Date	
	Batch	Batch	Spike	Sample	MS	%		
	No.	No.	Added	Units	Result	Rec.	Flag	Analyzed
Dissolved ICP Metals		1982	1.0		COMPLETE			10/17/2005
Iron, Diss (ICP)		1928	1.92	mg/L	<0.10	1.92	100	10/17/2005
Iron, Diss (ICP)		1928	1.92	mg/L	0.34	2.30	102	10/17/2005
Arsenic, Diss (GFAA)		1124	0.0227	mg/L				10/19/2005
Arsenic, Diss (GFAA)		1124	0.0227	mg/L	<0.0010	0.0186	82	10/19/2005

## QUALITY CONTROL REPORT DUPLICATES

Yuta Nagunama  
BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Job Number: 05.13980

Analyte	Prep	Run	Duplicate				RPD	Date	Max.			
	Batch	Batch	Sample	Sample	Units	Flag						
	No.	No.	Result	Result								
Dissolved ICP Metals		1982	COMPLETE	COMPLETE				10/17/2005	20			
Iron, Diss (ICP)		1928	<0.10	<0.10	mg/L			10/17/2005	20			
Iron, Diss (ICP)		1928	1.5	1.5	mg/L	0.0		10/17/2005	20			
Arsenic, Diss (GFAA)		1124	<0.0010	<0.0010	mg/L			10/19/2005	20			

## QUALITY CONTROL REPORT MATRIX SPIKE/MATRIX SPIKE DUPLICATE

BARKER, LEMAR & ASSOCIATES  
1801 Industrial Circle  
West Des Moines, IA 50265

10/21/2005

Yuta Nagunama

Job Number: 05.13980

Analyte	Prep	Run	Analysis	MS	MS	MSD	MSD	MS/MSD	
	Batch	Batch							
Number	Number	Result	Units	Result	% Recovery	Result	% Recovery	RPD	
Chloride, FIA		1312	143	mg/L	155	48.0	156	52.0	0.6
COD, LL		794	9.3	mg/L	61.3	104.0	61.4	104.2	0.2
Ammonia Nitrogen FIA		715	<0.20	mg/L	10.1	101.0	10.1	101.0	0.0
Ammonia Nitrogen FIA		716	1.37	mg/L	11.4	100.3	11.4	100.3	0.0
Phenols, Total(FIA)		1632	<0.020	mg/L	0.101	101.0	0.100	100.0	1.0
Phenols, Total(FIA)		1633	<0.020	mg/L	0.100	100.0	0.102	102.0	2.0
Total Organic Halogens		1412	<0.010	mg/L C	0.09386	93.9	0.09522	95.2	1.4

NOTE: Matrix Spike Samples may not be samples from this job.

NA = Not Applicable

MS = Matrix Spike

MSD = Matrix Spike Duplicate

RPD = Relative Percent Difference

[www.testamericainc.com](http://www.testamericainc.com)

TestAmerica Analytical Testing Corporation | TestAmerica Drilling Corporation | TestAmerica Air Emission Corporation

TestAmerica Job Number: 05.13980

#### ATTACHMENTS

Following are the sample receipt log and the chain of custody applicable to this analytical report.

Any abnormalities or departures from sample acceptance policy shall be documented on the "Sample Receipt and Temperature Log Form" and Sample Non-Conformance Form" (if applicable) included with this report.

For information concerning certifications of this facility or another TestAmerica facility please visit our website at [www.TestAmericaInc.com](http://www.TestAmericaInc.com).

This data has been produced in compliance with 2003 NELAC Standards (July 2005), except where noted.

Samples collected by TestAmerica Field Services personnel are noted on the Chain of Custody (COC) and are sampled in accordance with TA-CF SOP CF09-01.

This report shall not be reproduced, except in full, without written approval of the laboratory.

*For questions regarding this report, please contact the individual who signed the analytical report.*

### Incorporate

704 Enterprise Drive  
Cedar Falls, Iowa 50613

SAMPLER: JOE HERRICK

SITE NAME: Anderson Excavating & Wrecking, Council Bluffs C&D Landfill

CITY/STATE/ZIP: West Des Moines, IA 50265

Fax: 515-256-0152

SAMPLED BY: (PRINT NAME)

SIGNATURE

**Phone:** 319-277-2401                          **or**                          1-800-750-2401  
**Fax:** 515-792-7989

**REPORT TO:**

NAME: Yuta Nagunama

**COMPANY NAME:** Barker Lemar Engineering Consultants

**PROJECT NAME:** Anderson Excavating & Wrecking Council Bluffs C&D Landfill (October)

**PROJECT NUMBER:** ANDEX D5001

ADDRESS: 1801 Industrial Circle

**CITY/STATE/ZIP:** West Des Moines, IA 50265

**LABORATORY WORK ORDER NO.**

Sample ID	October 05					LABORATORY WORK ORDER NO.													
	Date Sampled	Time Sampled	# of Containers Shipped	Grab	Composite	Field Filtered	Preservative	Matrix			Analyze For:								
I-3	10/10	11:25	5	X		X X	HNO <sub>3</sub> (Red & White Label)	Ice	Groundwater	Wastewater	Drinking Water	Sludge	Soil	Other (Specify):	"or" list	"or" list	"or" list	Arsenic	
I-4		11:50					HCl (Blue & White Label)								X	X	X		
I-9		11:00					NaOH (Orange & White Label)									X	X		
I-10		10:00					H <sub>2</sub> SO <sub>4</sub> , Plastic (Yellow & White Label)									X	X		
I-11		10:25					H <sub>2</sub> SO <sub>4</sub> , Glass (Yellow & White Label)									X	X		
Received by:	Date:	Time:	Received by:	Test America				Date:	Time:	Relinquished by:	J.21						Date:	Time:	
Shipped Via:			Comments:	J.21				10-12-05	2:35pm	J.21	J.21						10-12-05	2:50pm	
Used for Lab by:	Date:	Time:	Temperature Upon Receipt:	J.21				Laboratory Comments:											
J.21	10/12/05	1950																	

# TestAmerica

ANALYTICAL TESTING CORPORATION

704 ENTERPRISE DRIVE • CEDAR FALLS, IA 50613 • 800-750-2401 • 319-277-2425 FAX

## Sample Receipt and Temperature Log Form

Client: Barker Lemon

Project: AEW - Council Bluffs, Ia

City: Iowa City, IA

JM14 10/12/05

Date: 10/12/05 Receiver's Initials JM14

Time (Delivered): 10:00 1950

### Temperature Record

Cooler ID# (If Applicable)	<u>NA-100</u>
<u>1</u> °C / <u>On Ice</u>	

### Thermometer:

- IR - 905085 "A"
- IR - 809065 "B"
- CF07-03-T2
- 22126775

Temp Blank

Temperature out of compliance

### Courier:

- |                                    |  |
|------------------------------------|--|
| <input type="checkbox"/> Airborne  | <input type="checkbox"/> Speedy                |
| <input type="checkbox"/> UPS       | <input checked="" type="checkbox"/> TA Courier |
| <input type="checkbox"/> Velocity  | <input type="checkbox"/> TA Field Svcs         |
| <input type="checkbox"/> FedEx     | <input type="checkbox"/> Client                |
| <input type="checkbox"/> DHL       |  |
| <input type="checkbox"/> US Postal | <input type="checkbox"/> Other                 |

Custody seals present?

Yes

Custody seals intact?

Yes  No

Non-Conformance report started

### Exceptions Noted

Sample(s) not received in a cooler.

Samples(s) received same day of sampling.

Evidence of a chilling process

Temperature not taken:

Log-In by:

CW  EM

OT \_\_\_\_\_

**APPENDIX D**  
**EXCEEDANCE TABLE**

# **Summary of Statistical Exceedances Groundwater**

## **Monitoring Wells by Well Cluster**

**Council Bluffs Construction and Demolition Landfill - 78-SDP-04-89**

### **MW-10 - Cluster DN2**

#### **Chloride**

**Mean:** 8.34      **STD:** 4.21      **Exceedances Level:** 16.749

**Current Action Levels:** None Established

4/5/2005 34.5 mg/L

10/10/2005 42.2 mg/L

### **W-11 - Cluster DN1**

#### **Specific Conductance**

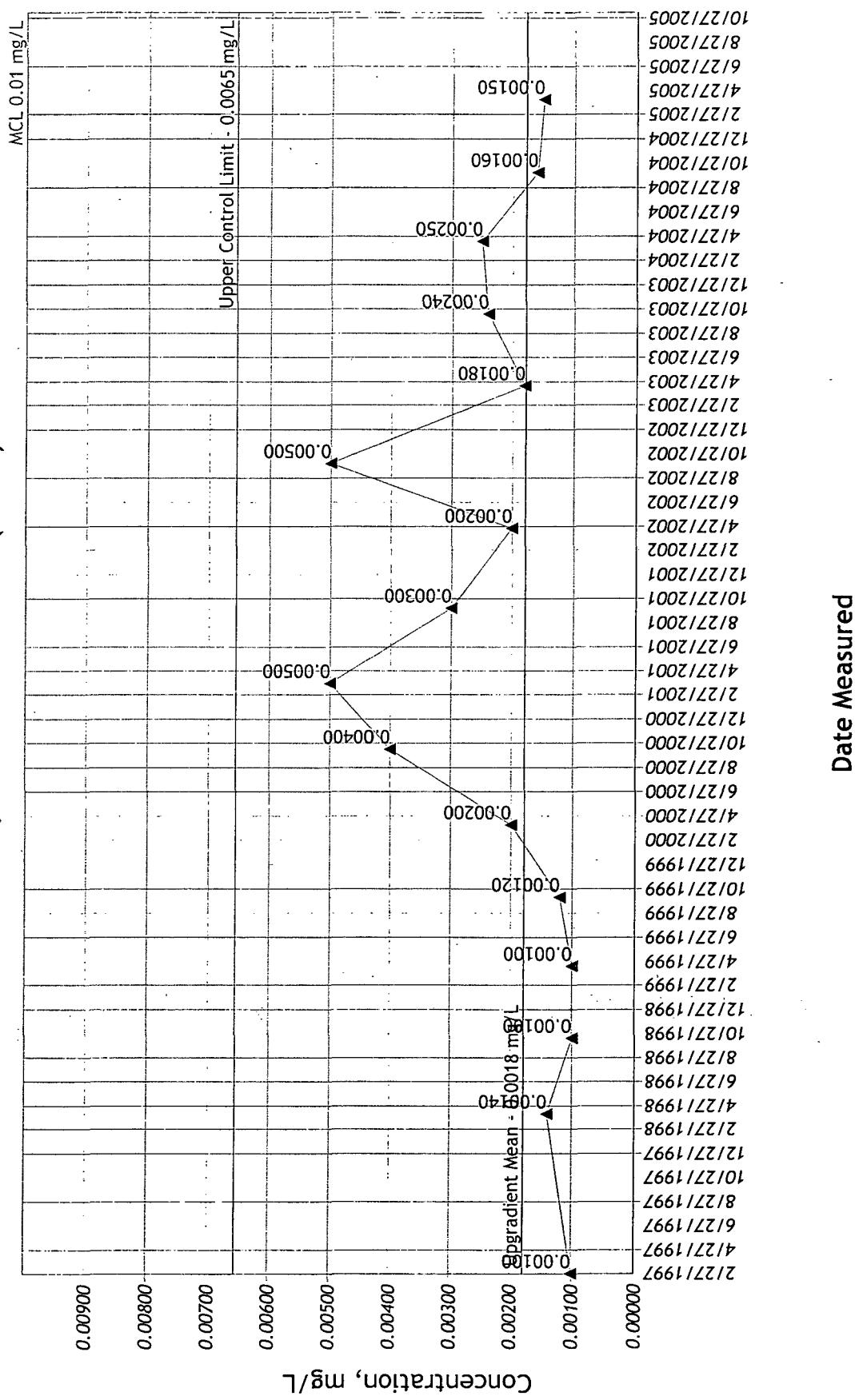
**Mean:** 1,109.0      **STD:** 480.0      **Exceedances Level:** 2,068.88

**Current Action Levels:** None Established

10/10/2005 2,107 umhos/cm

**APPENDIX E**  
**GRAPHS OF ANALYTICAL**  
**PARAMETERS/MONITORING POINTS**

### Arsenic, Dissolved Trends - (MW-2)

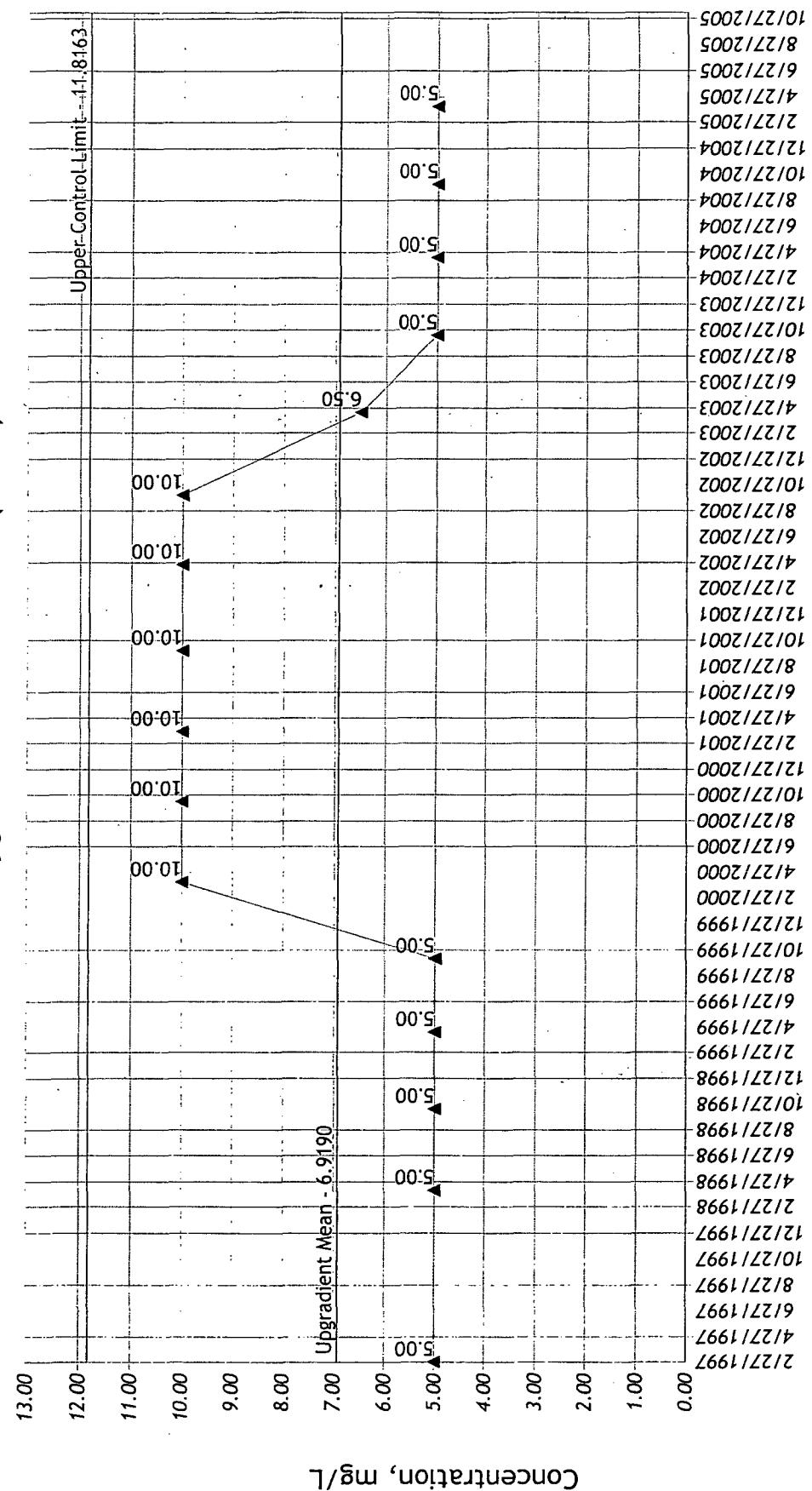


**1**  
Arsenic, Dissolved  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89

05001

11/9/2005 11:52:47 AM

## Chemical Oxygen Demand Trends - (MW-2)

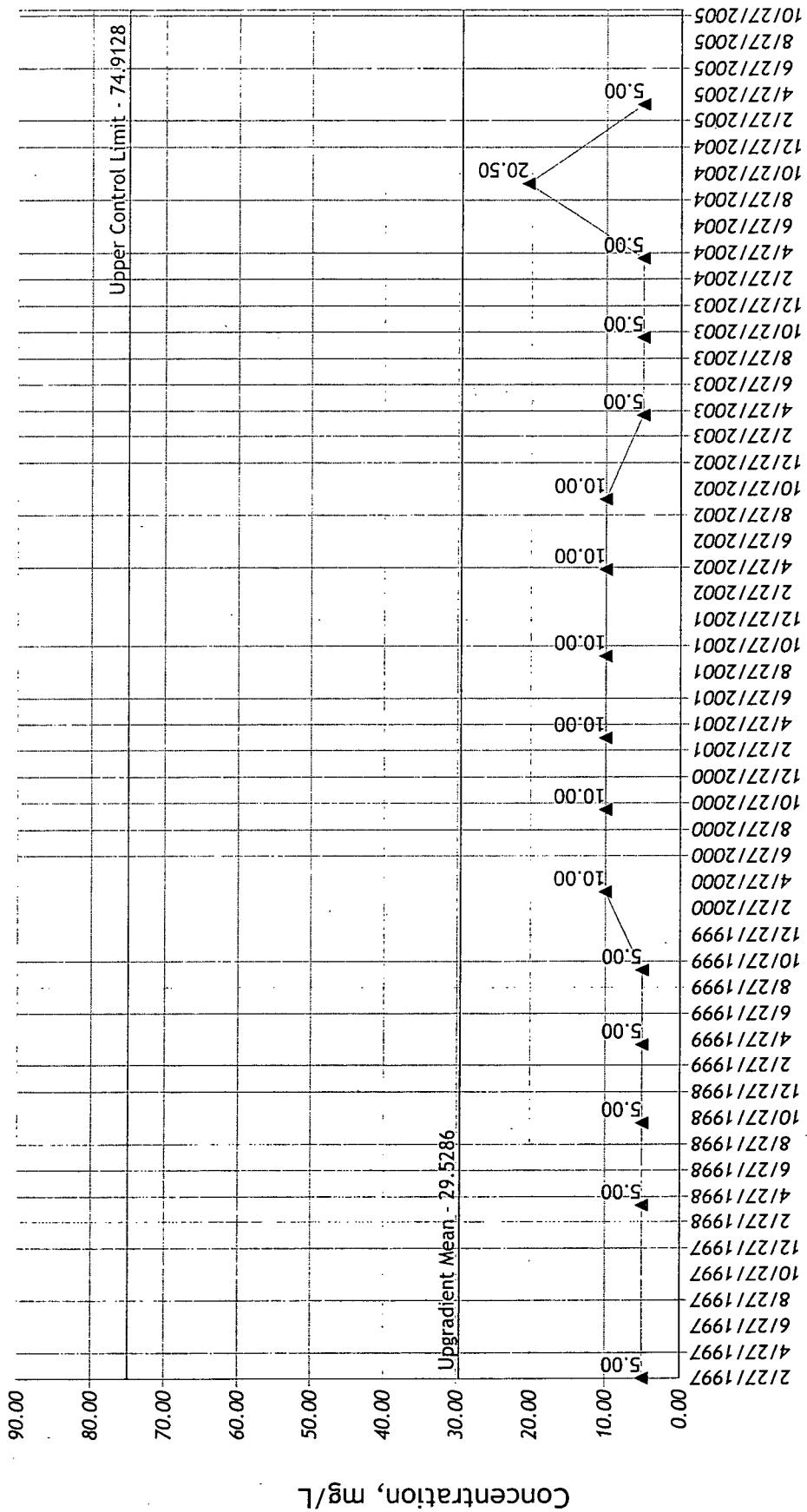


**Chemical Oxygen Demand  
Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

**2**

**05001**  
11/9/2005 11:52:49 AM

### **Chloride Trends - (MW-2)**

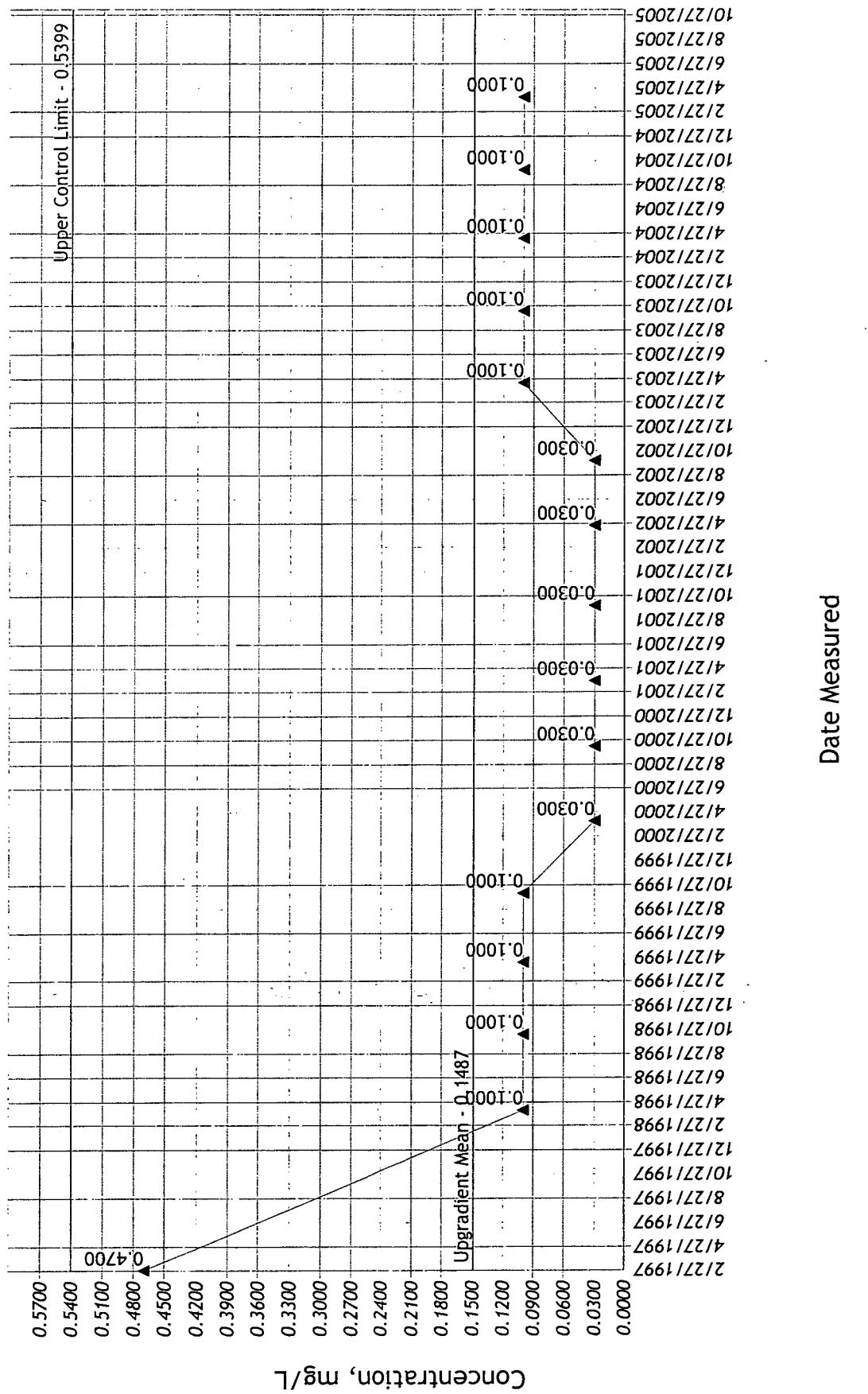


**Chloride  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89**

**3**

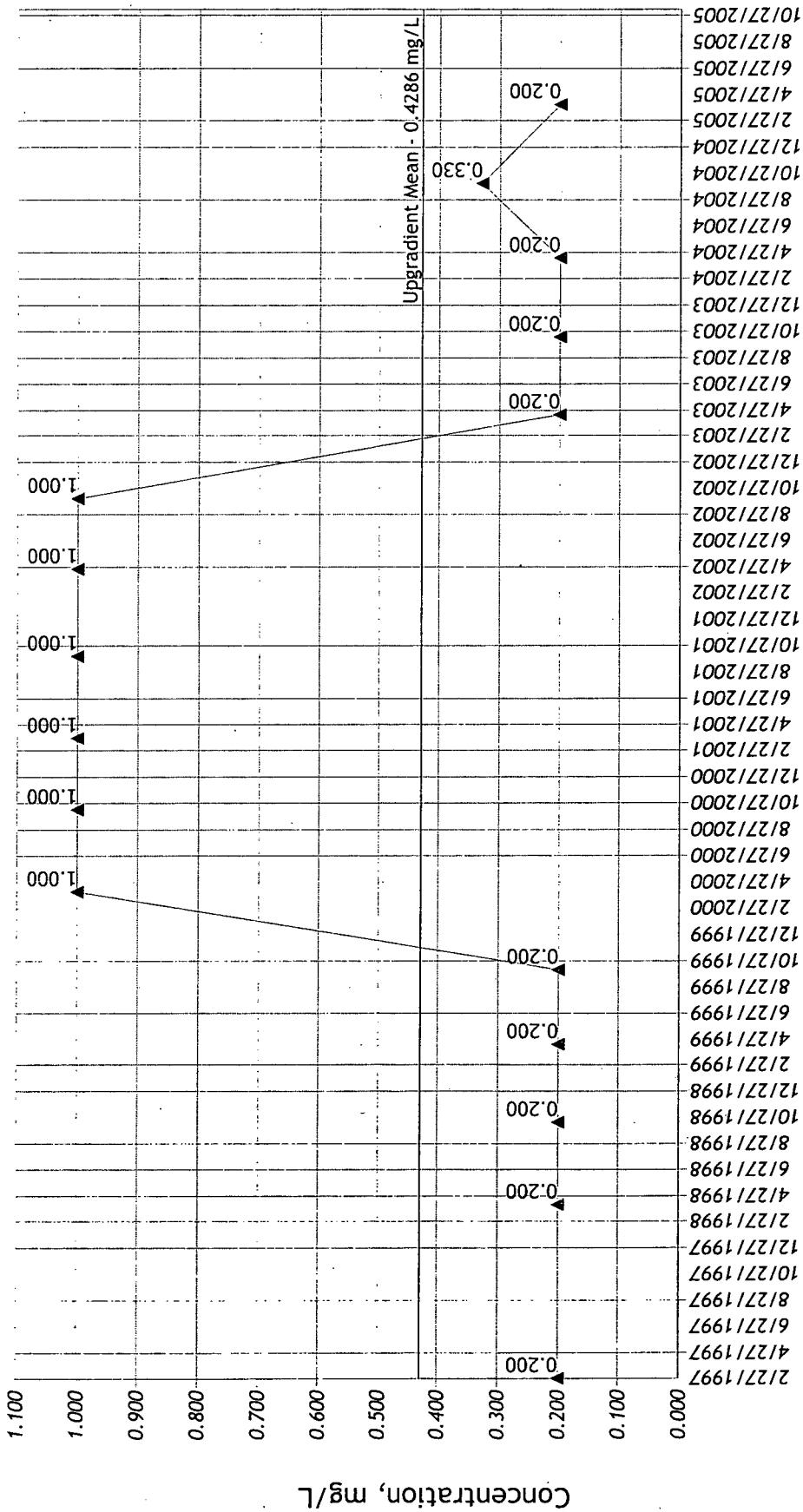
05001  
11/9/2005 11:52:50 AM

## Iron, Dissolved Trends - (MW-2)



Iron, Dissolved  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89

### Nitrogen, Ammonia Trends - (MW-2)



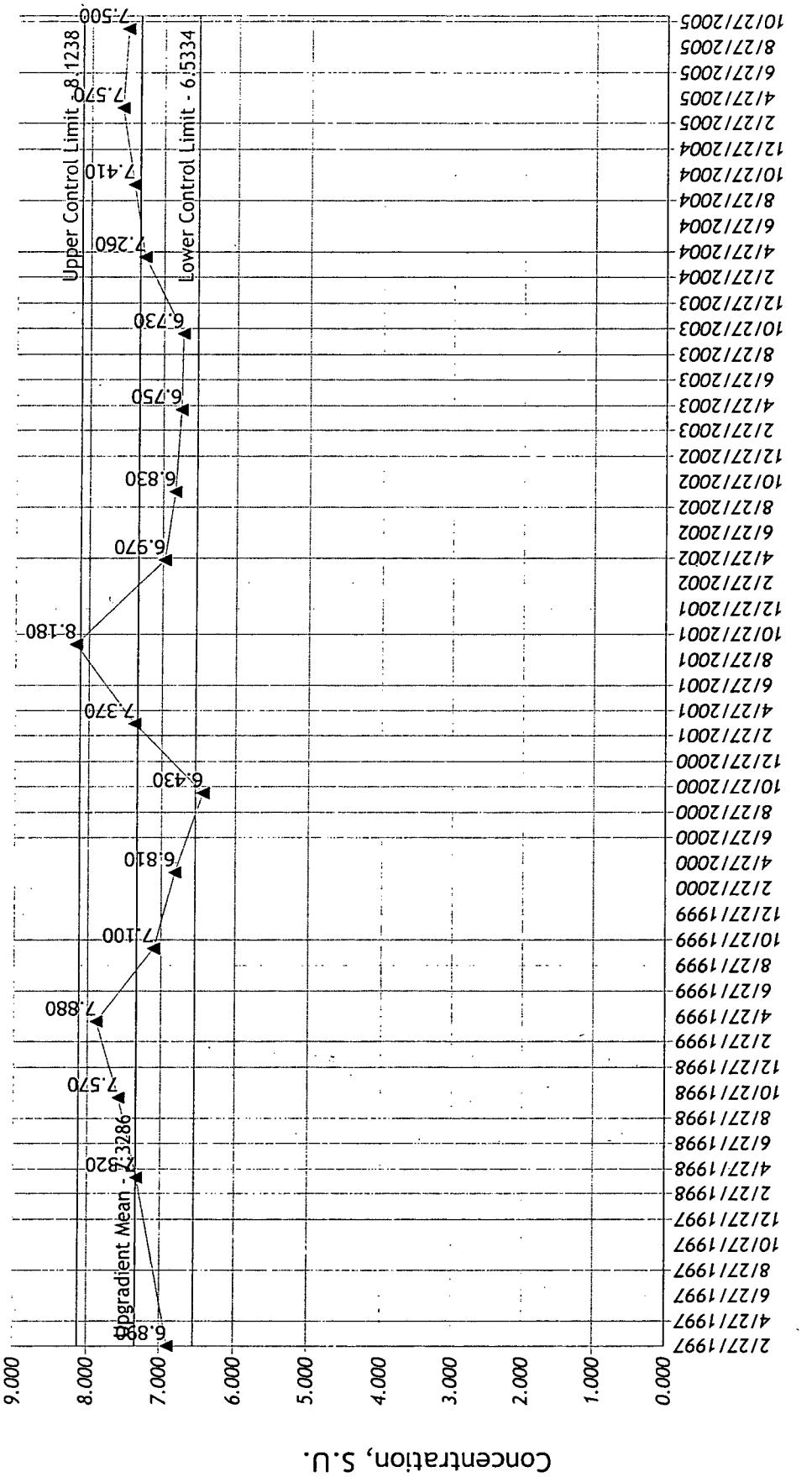
Note: The upper control/limit is not shown as the standard deviation was not calculated due to consistent parameter non-detect in the up-gradient monitoring point.

**Nitrogen, Ammonia  
Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

**5**

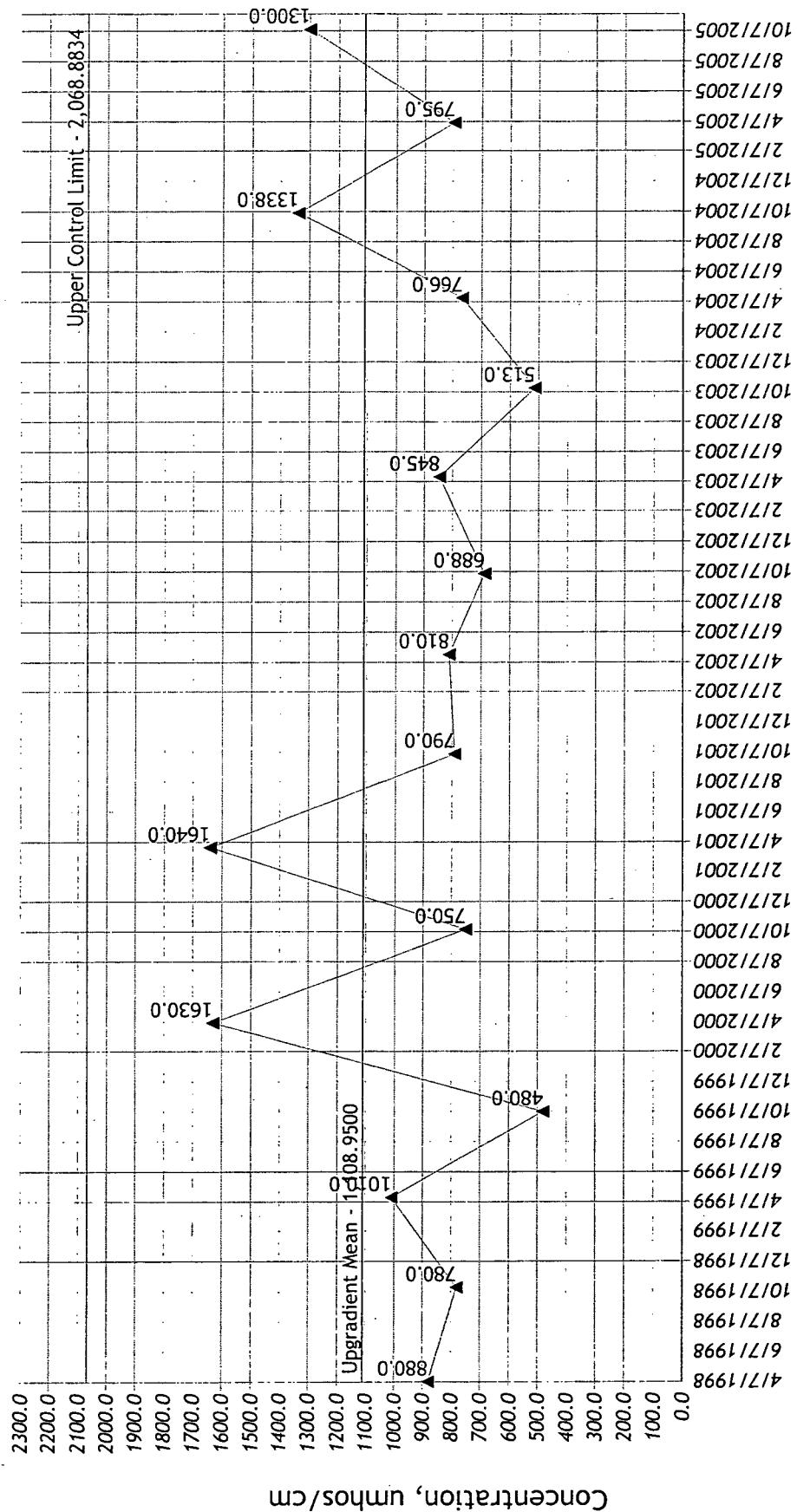
05001  
11/9/2005 11:52:53 AM

## pH Trends - (MW-2)



**pH**  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89

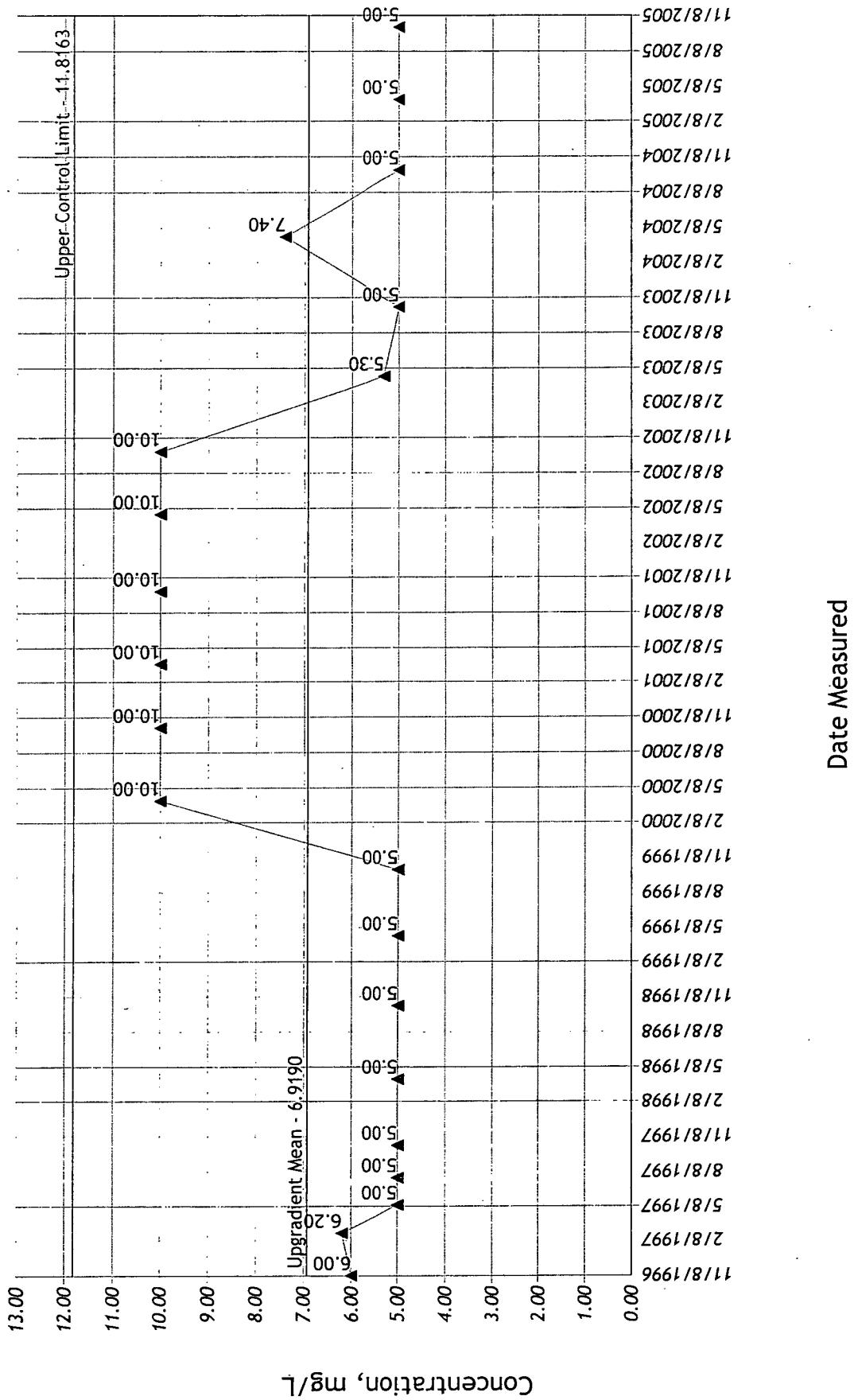
### Specific Conductance Trends - (MW-2)



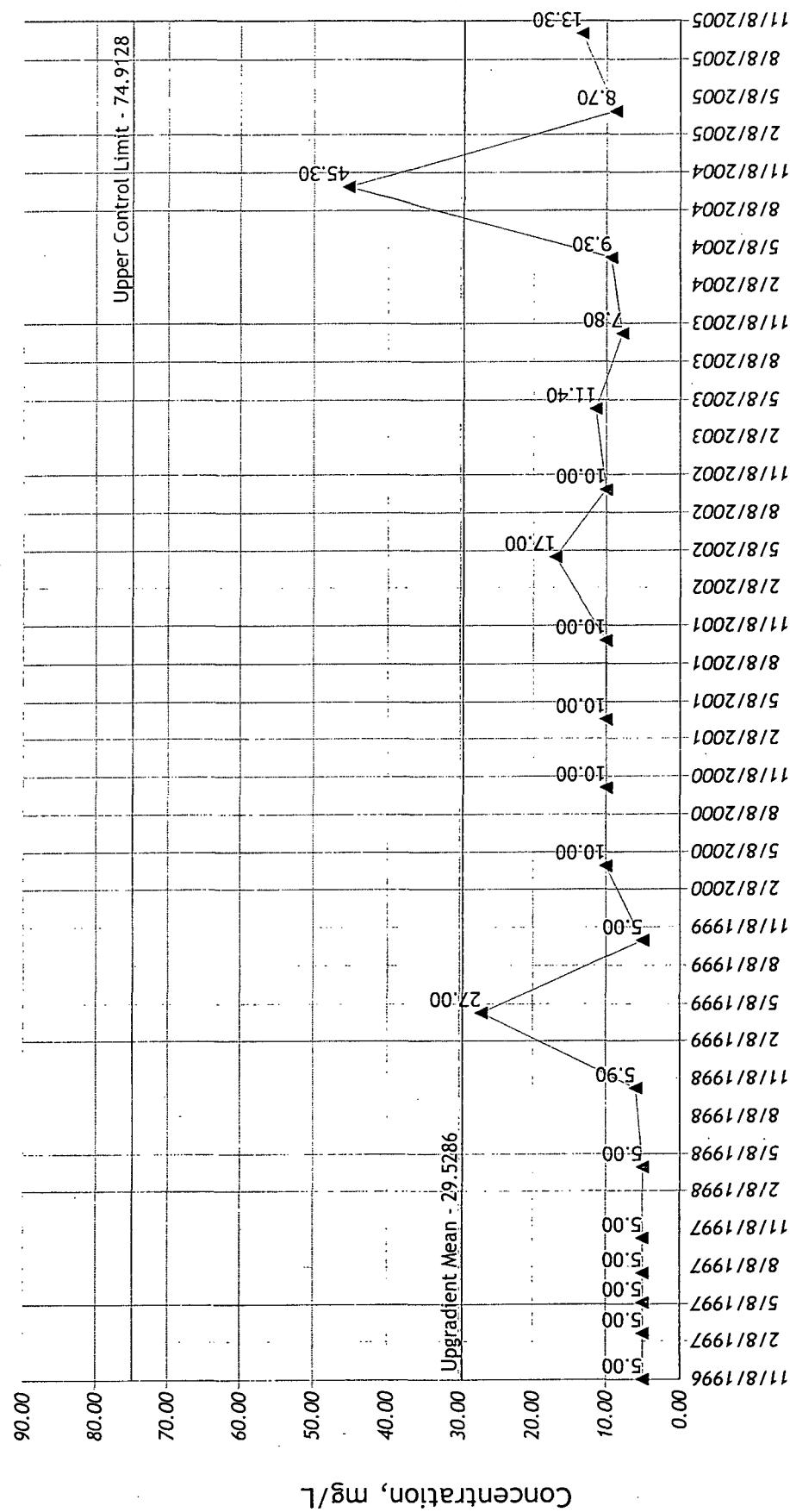
Date Measured

Specific Conductance  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89

### Chemical Oxygen Demand Trends - (MW-9)



### Chloride Trends - (MW-9)

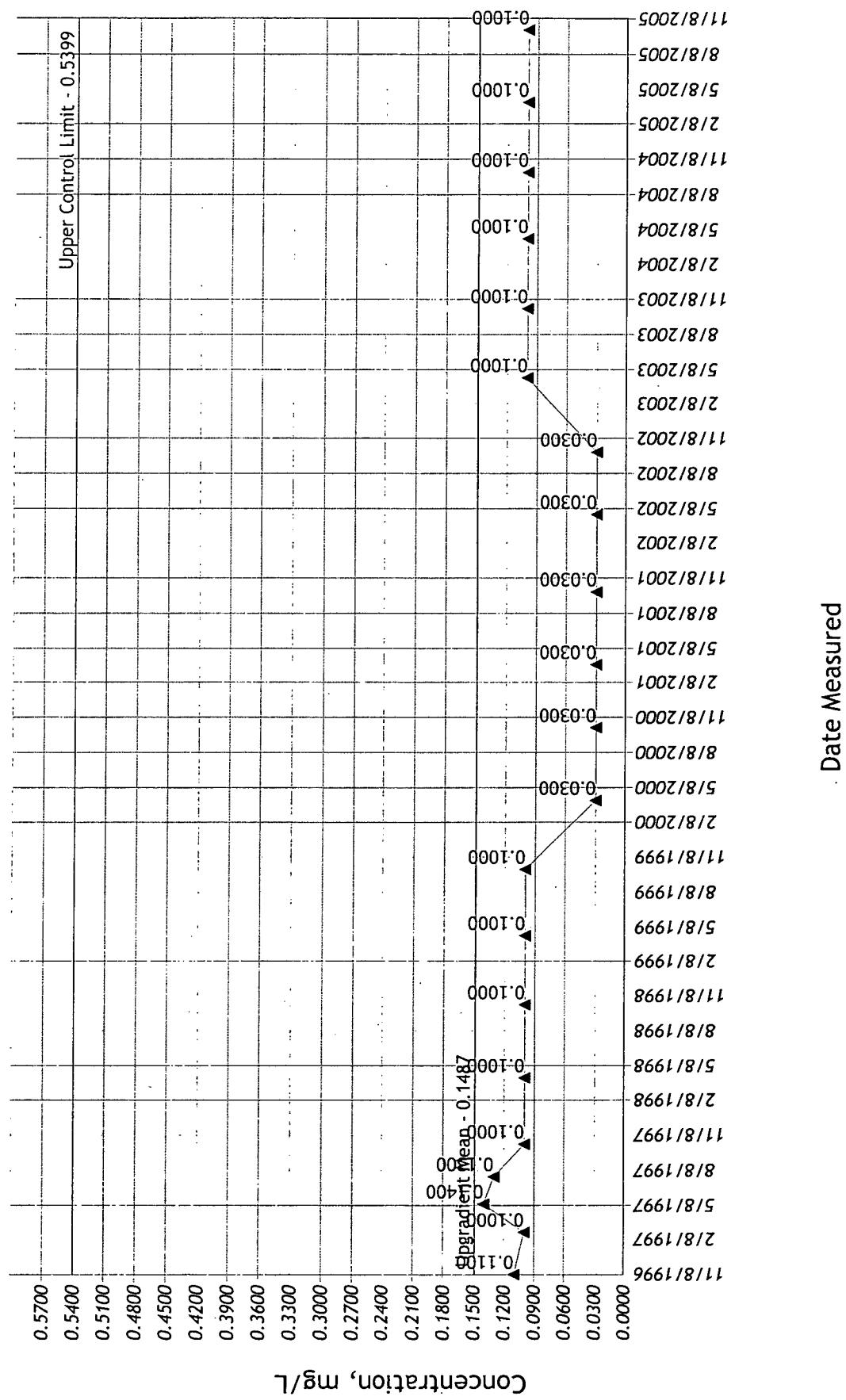


Chloride

Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89

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11/9/2005 11:52:59 AM

### Iron, Dissolved Trends - (MW-9)



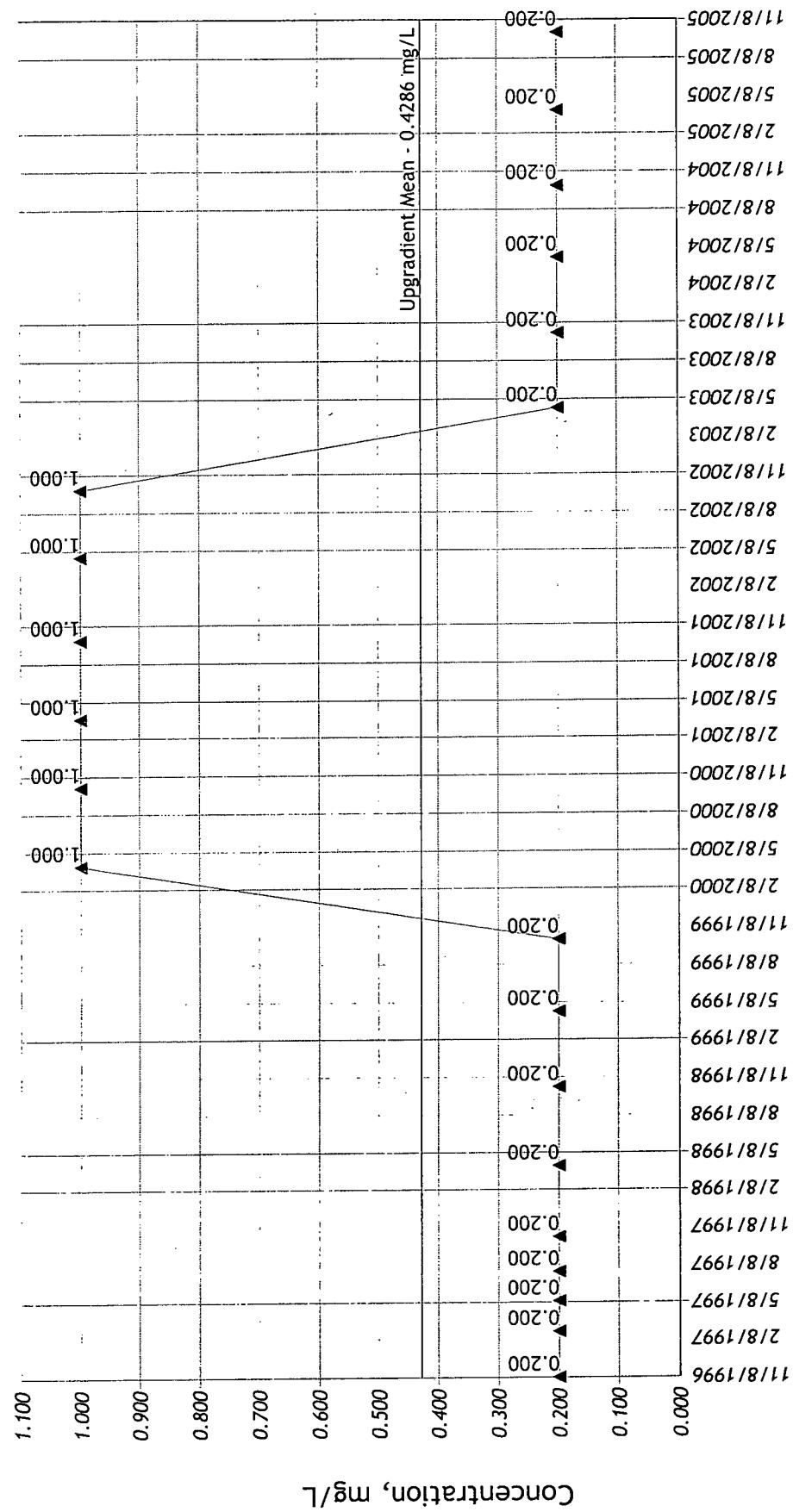
10

Iron, Dissolved  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89

05001

11/9/2005 11:53:00 AM

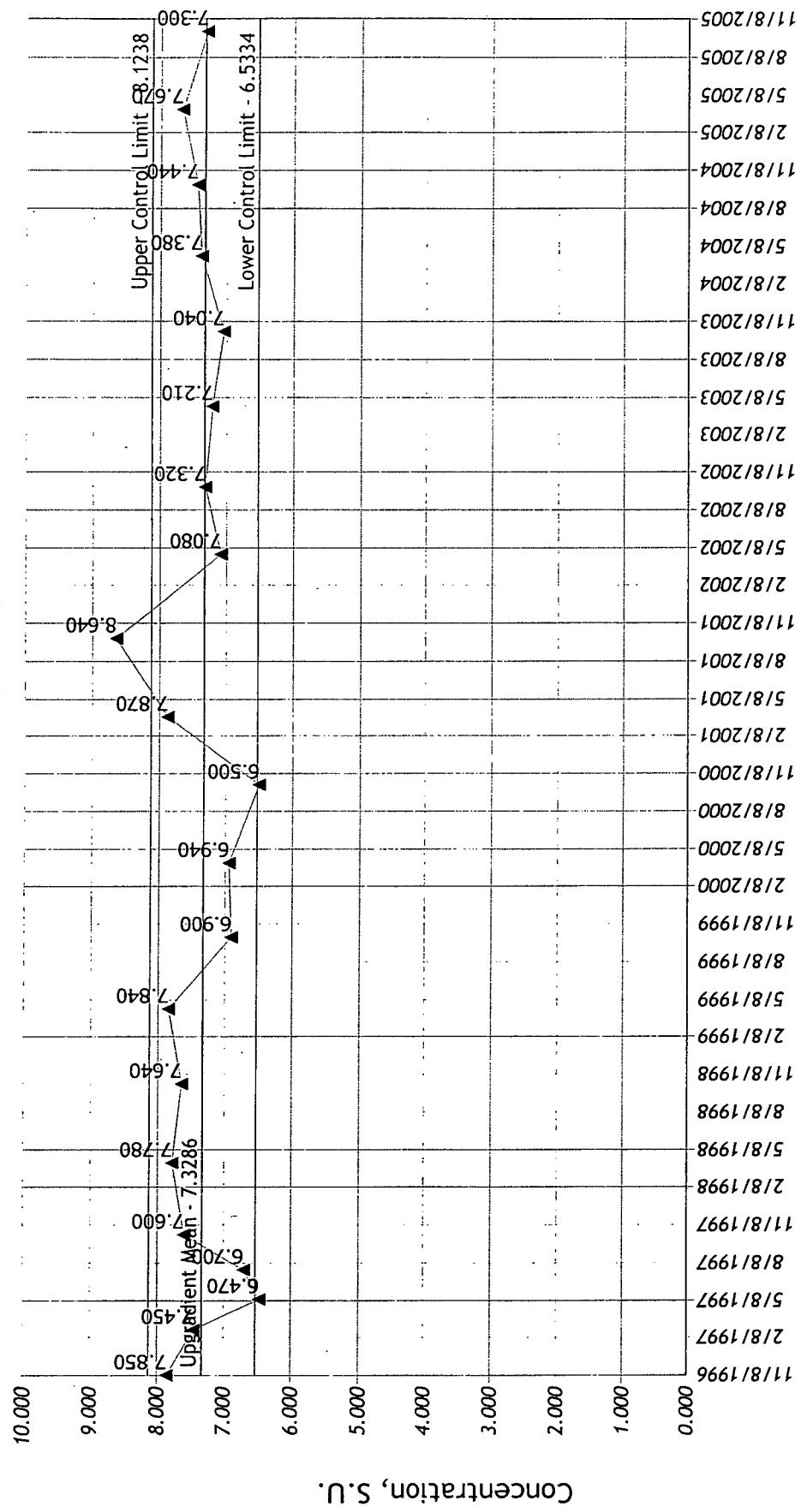
### Nitrogen, Ammonia Trends - (MW-9)



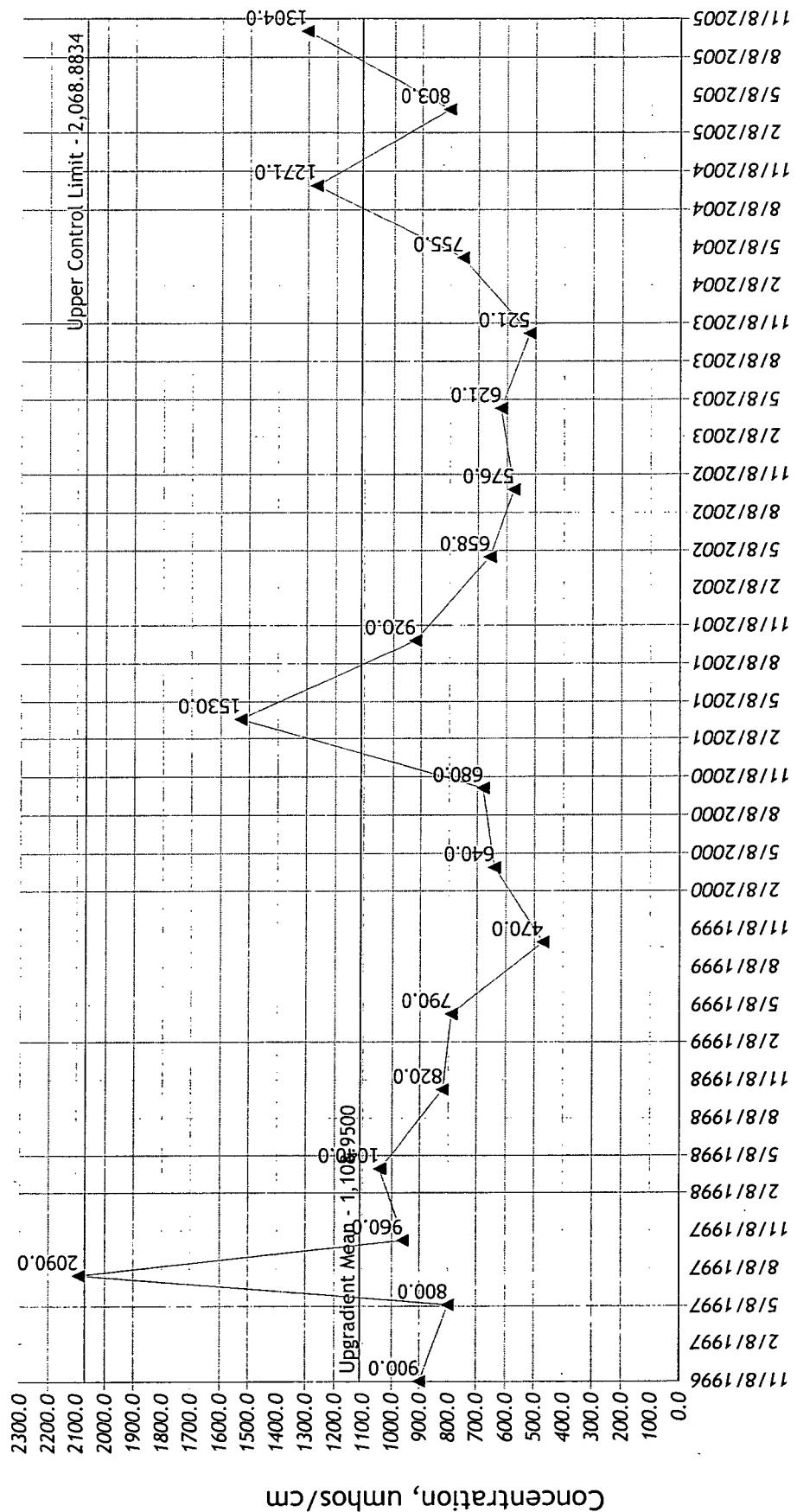
Note: The upper control/limit is not shown as the standard deviation was not calculated due to consistent parameter non-detect in the up-gradient monitoring point.

**Nitrogen, Ammonia**  
**Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

### pH Trends - (MW-9)



### Specific Conductance Trends - (MW-9)



**13**

### Specific Conductance

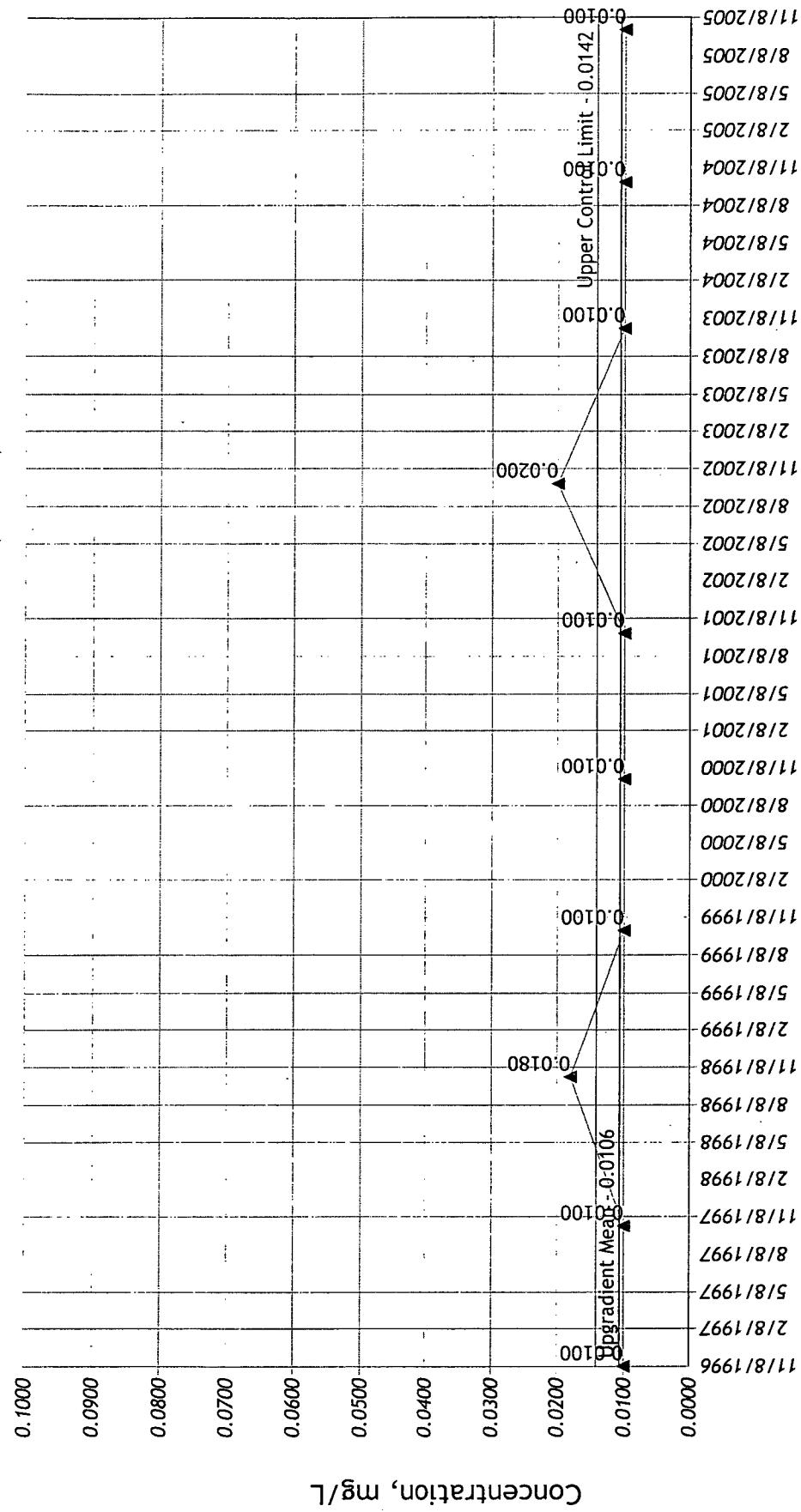
**Council Bluffs Construction and Demolition Landfill**

78-SDP-04-89

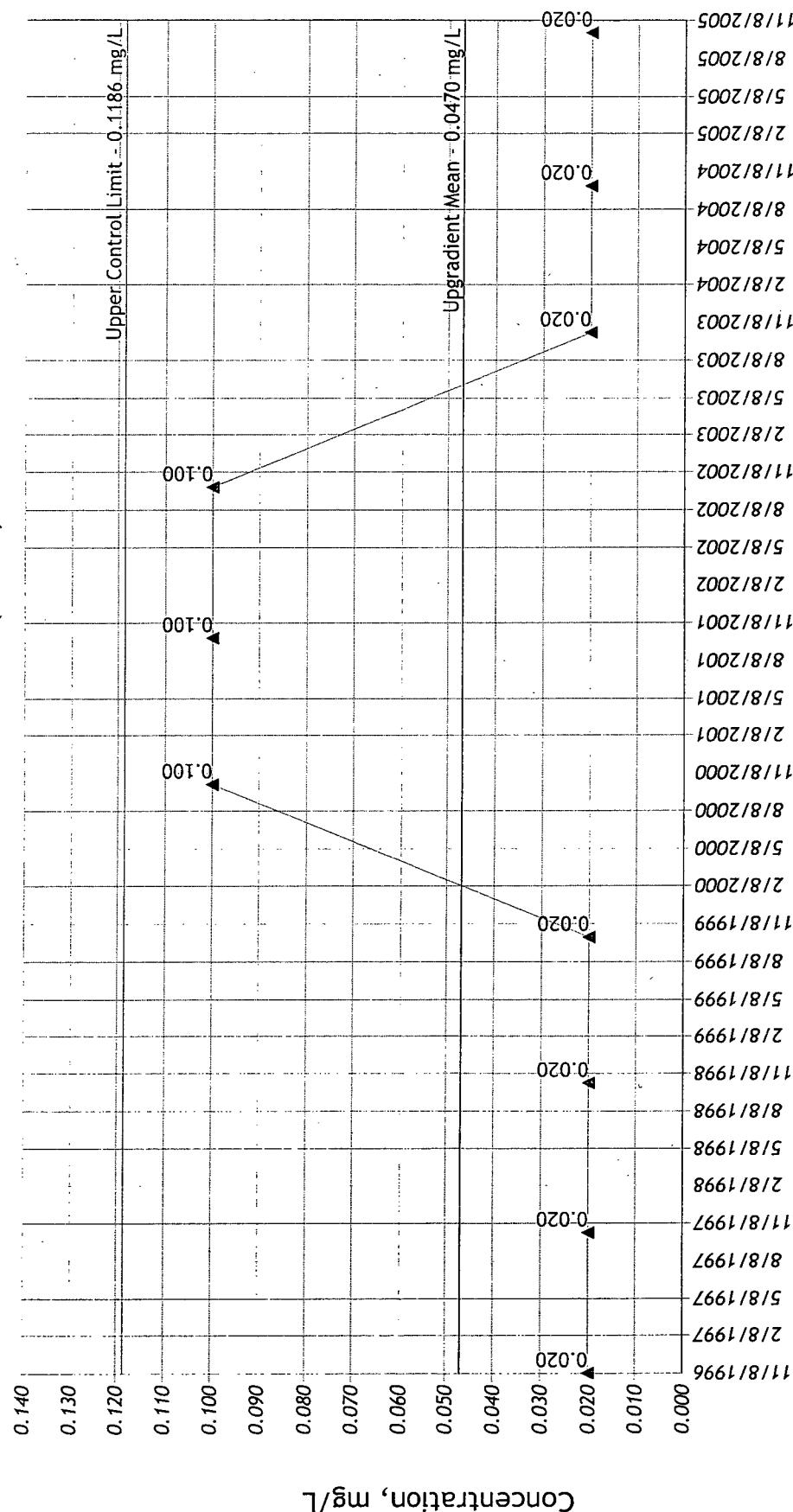
05001

11/9/2005 11:53:04 AM

### Total Organic Halogens Trends - (MW-9)

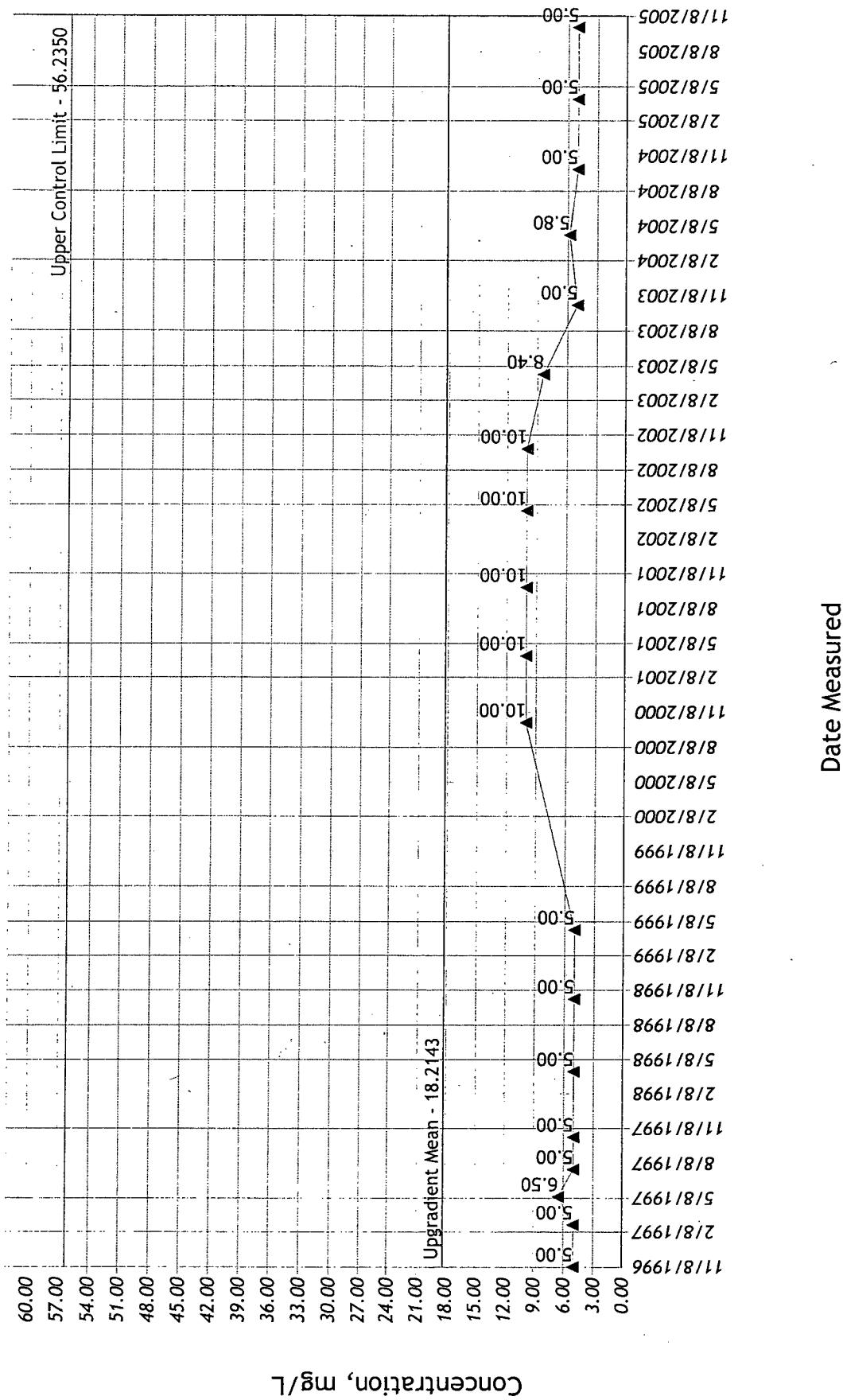


### Total Phenols Trends - (MW-9)



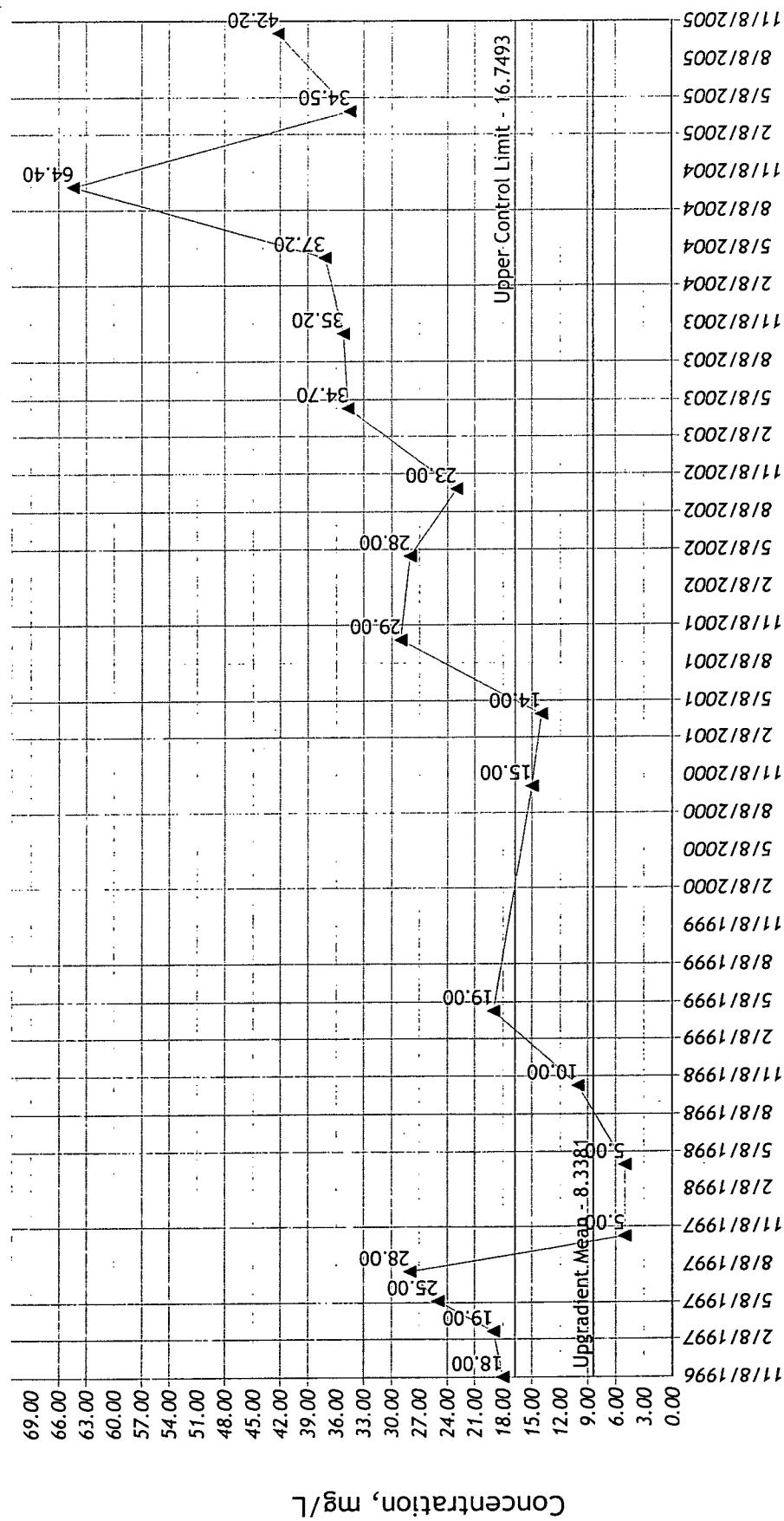
**Total Phenols**  
**Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

## Chemical Oxygen Demand Trends - (MW-10)



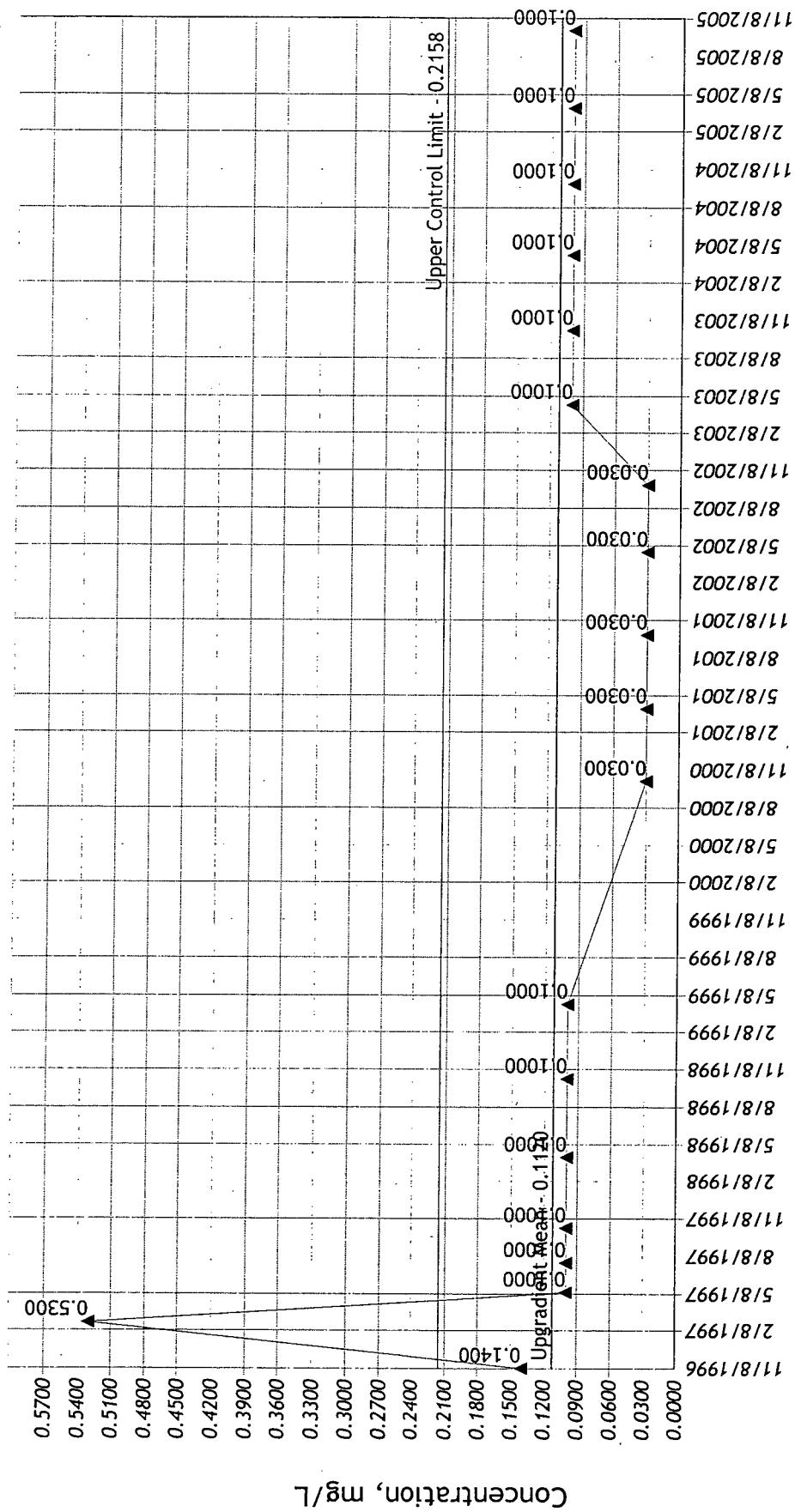
**Chemical Oxygen Demand  
Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

### **Chloride Trends - (MW-10)**



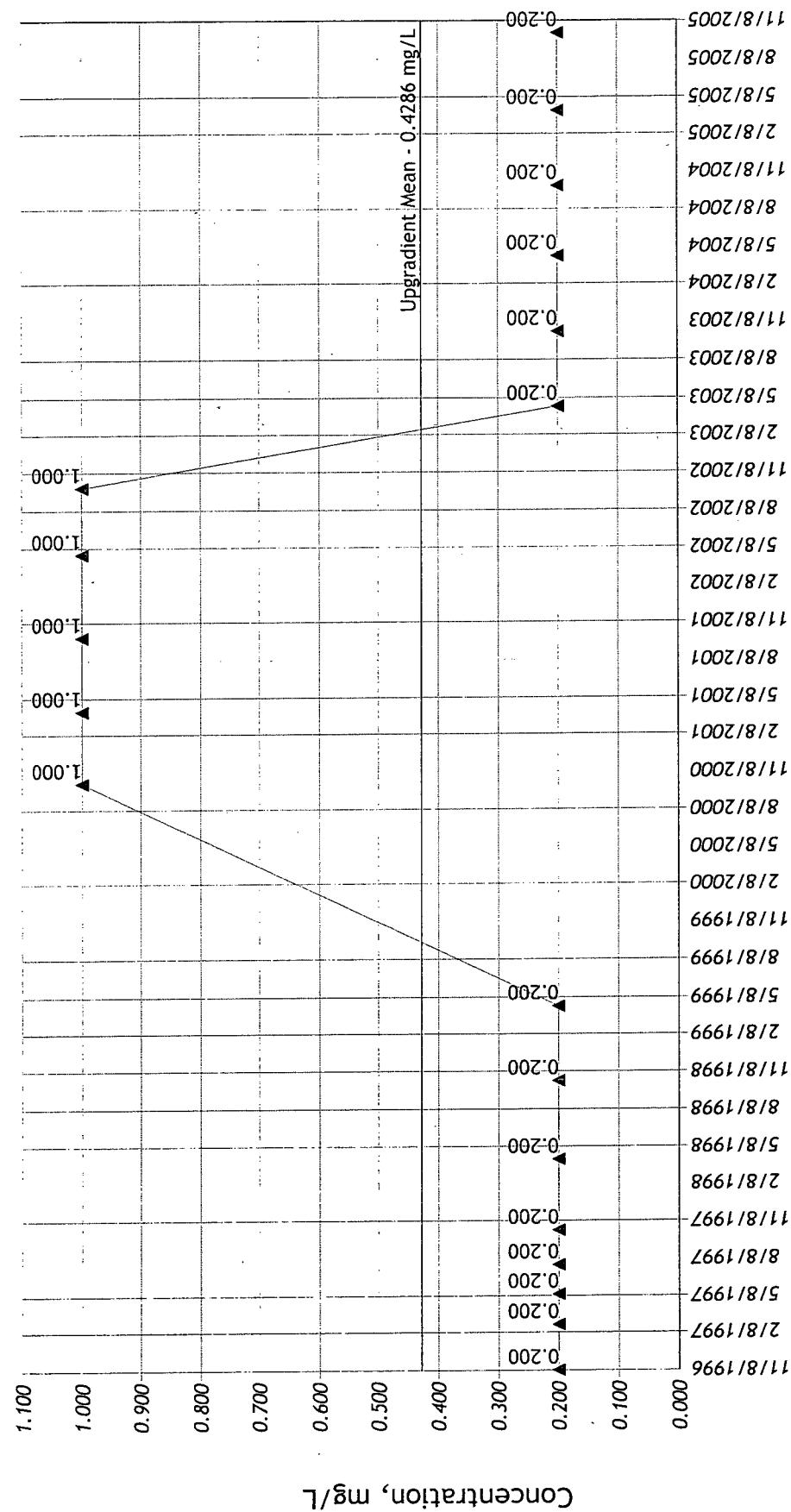
**Chloride**  
**Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

### Iron, Dissolved Trends - (MW-10)



Iron, Dissolved  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89

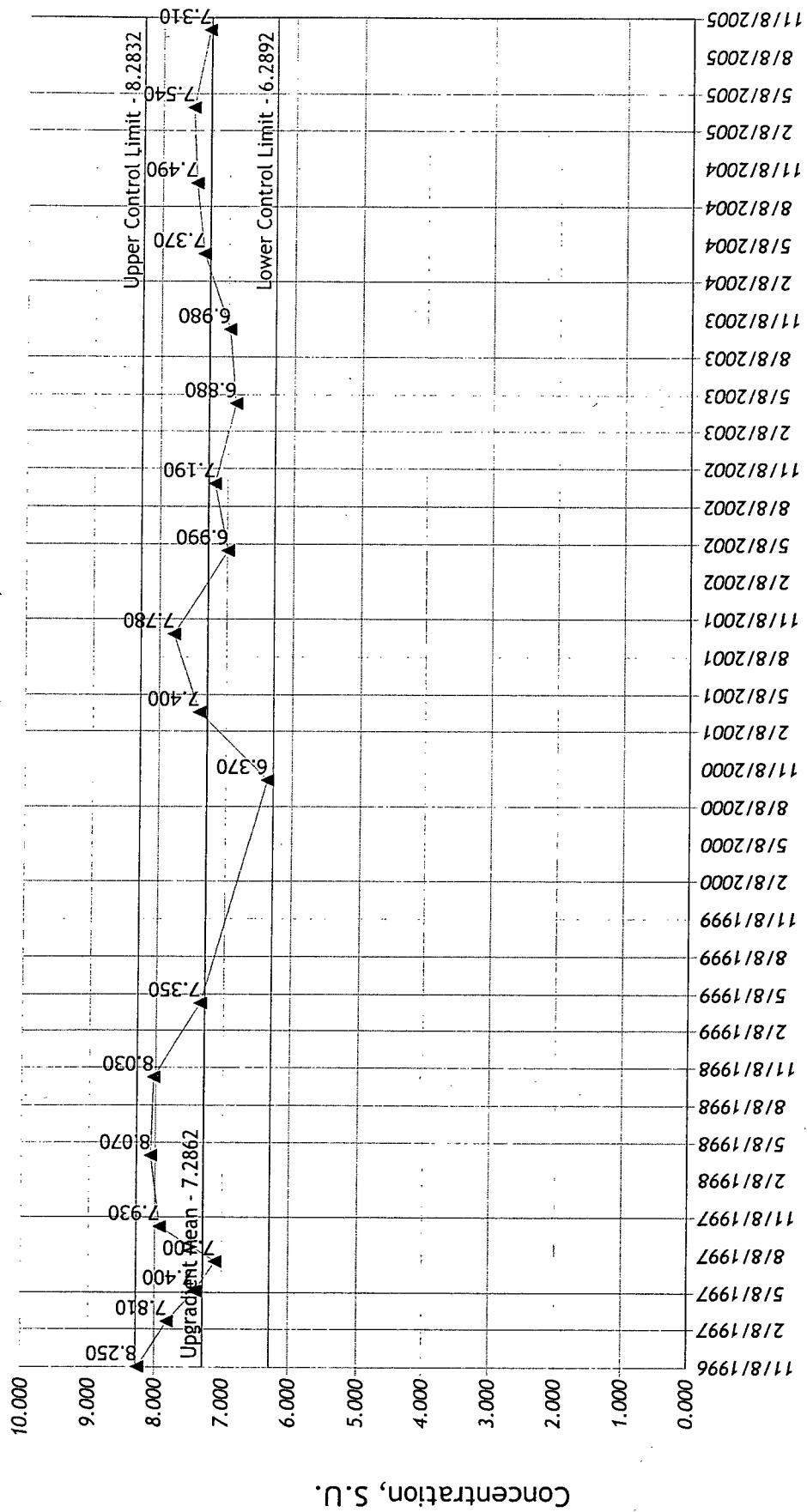
### Nitrogen, Ammonia Trends - (MW-10)



Note: The upper control/limit is not shown as the standard deviation was not calculated due to consistent parameter non-detect in the up-gradient monitoring point.

**Nitrogen, Ammonia**  
**Council Bluffs Construction and Demolition Landfill**  
 78-SDP-04-89  
**19**  
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 11/9/2005 11:53:12 AM

## pH Trends - (MW-10)

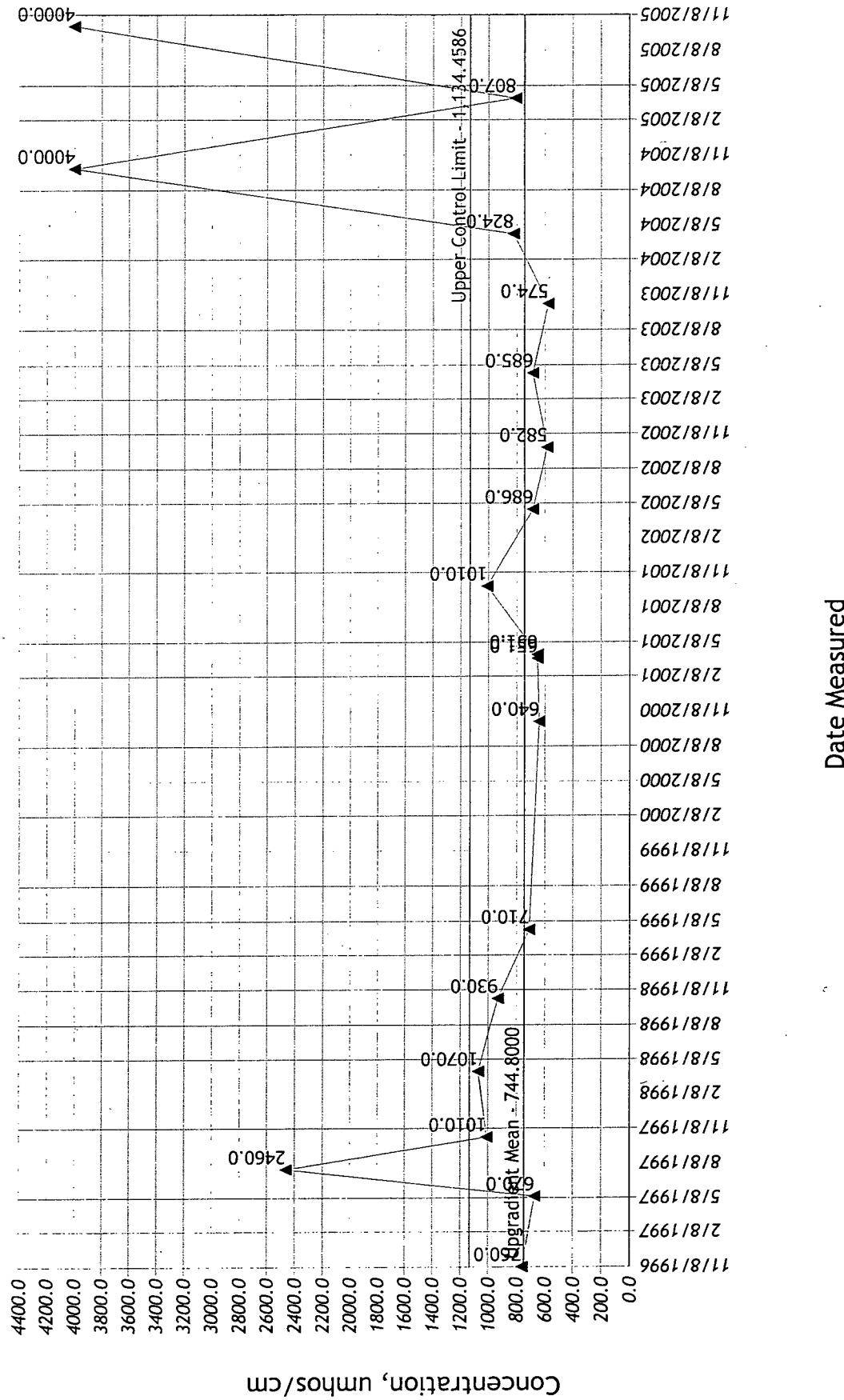


**PH**  
**Council Bluffs Construction and Demolition Landfill**  
 78-SDP-04-89

**20**

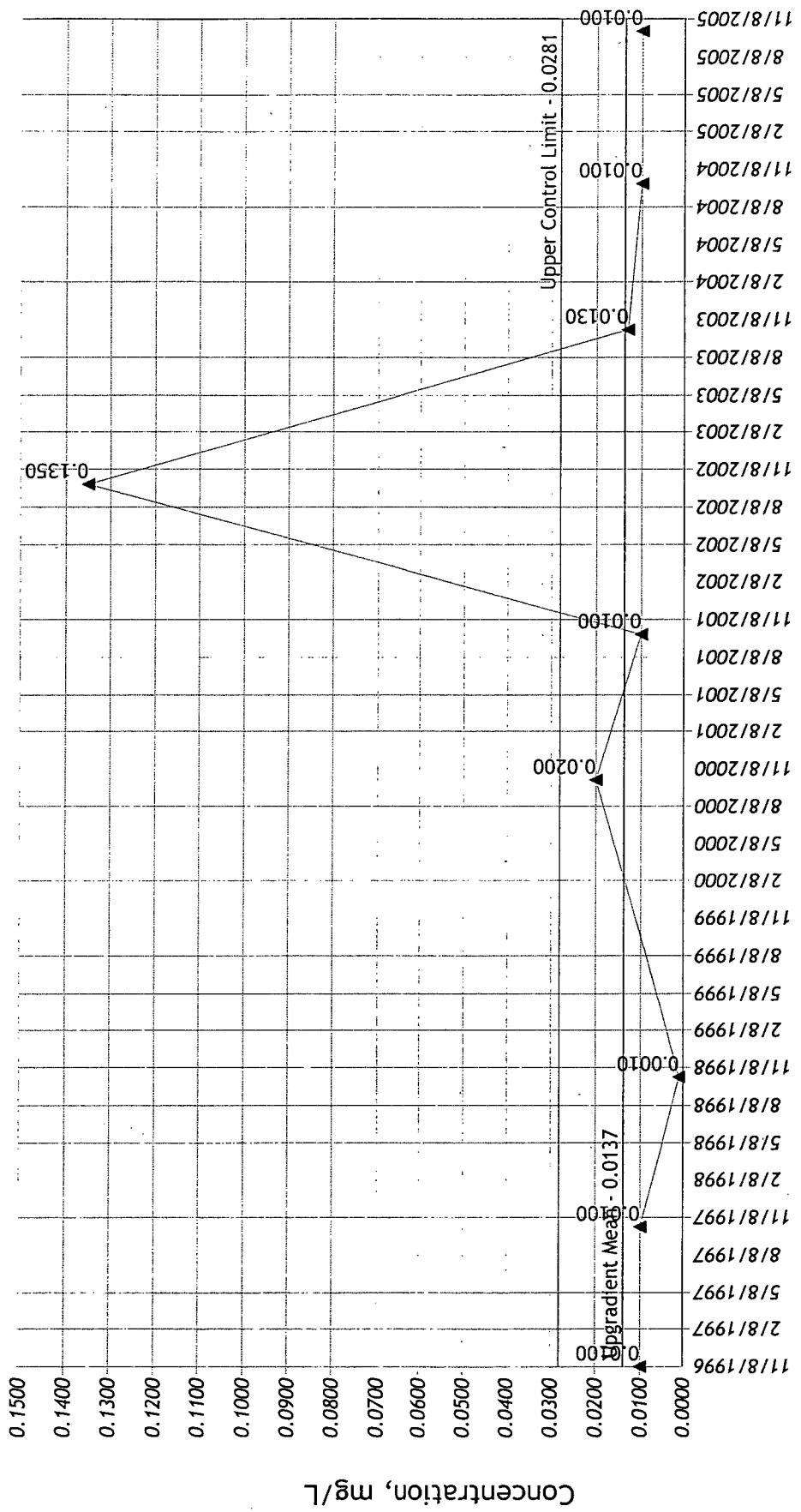
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 11/9/2005 11:53:13 AM

### Specific Conductance Trends - (MW-10)



Specific Conductance  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89

### Total Organic Halogens Trends - (MW-10)

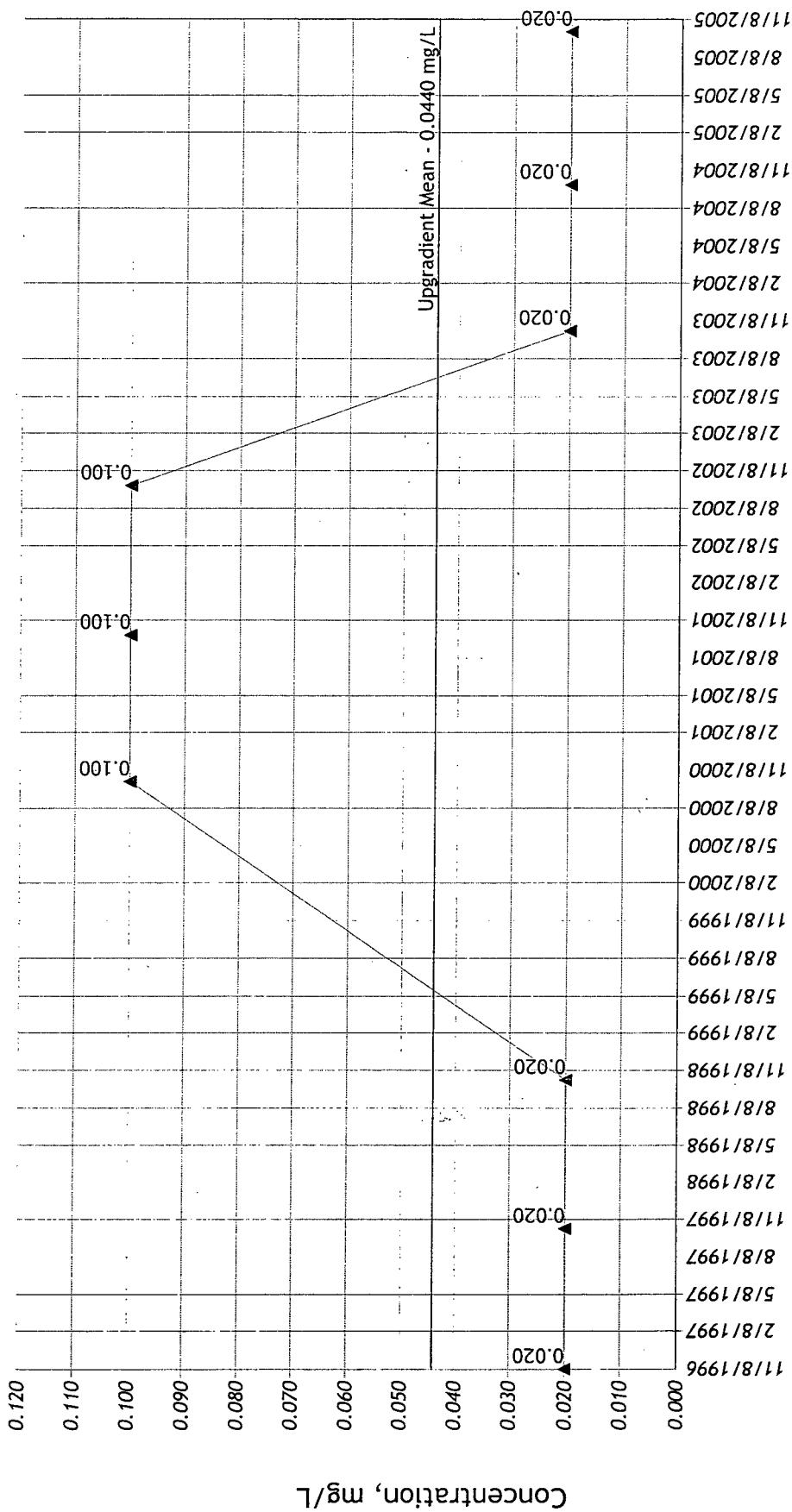


22

**Total Organic Halogens  
Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

05001  
11/9/2005 11:53:16 AM

### Total Phenols Trends - (MW-10)



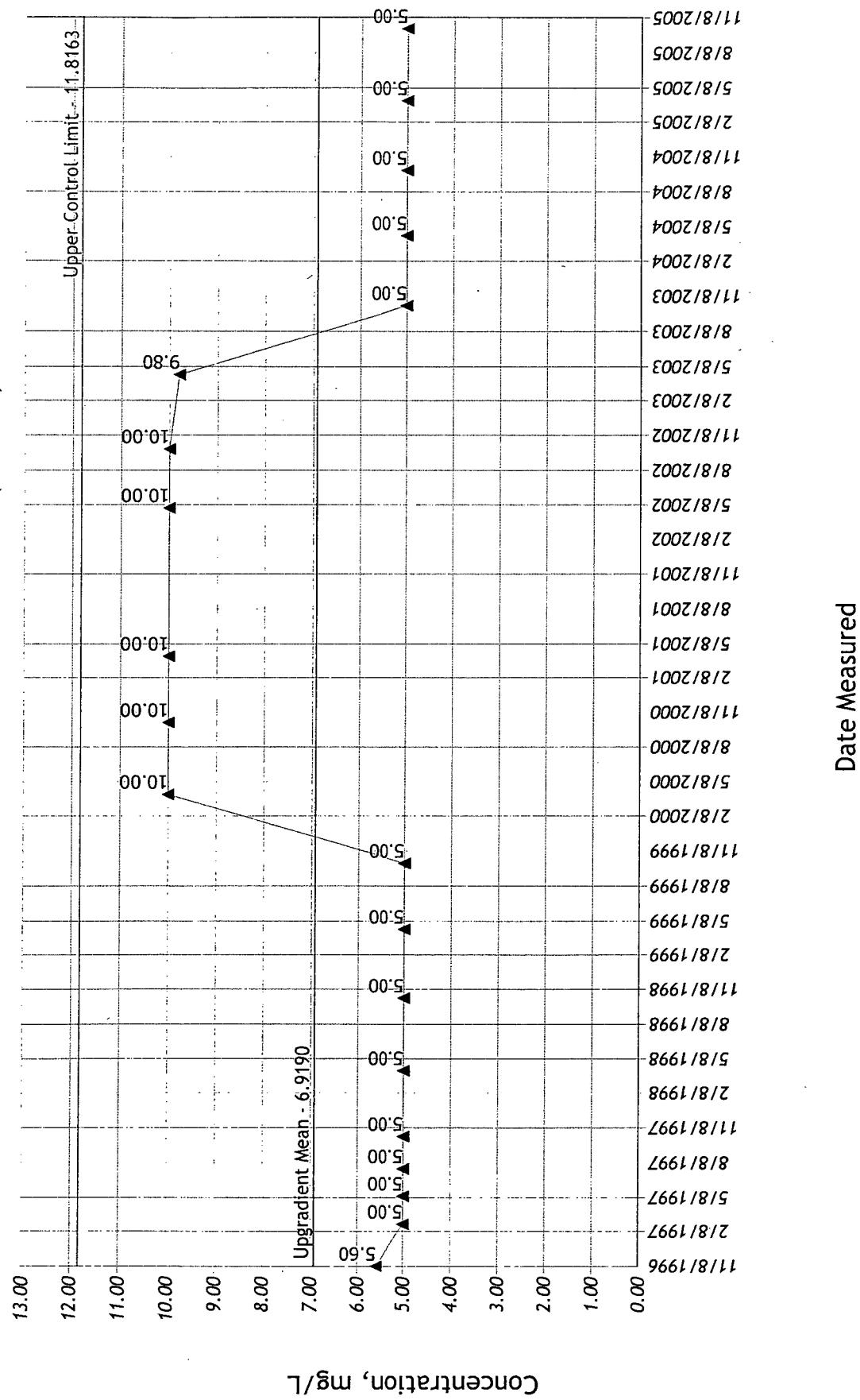
Note: The upper control/limit is not shown as the standard deviation was not calculated due to consistent parameter non-detect in the up-gradient monitoring point.

**Total Phenols**  
**Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

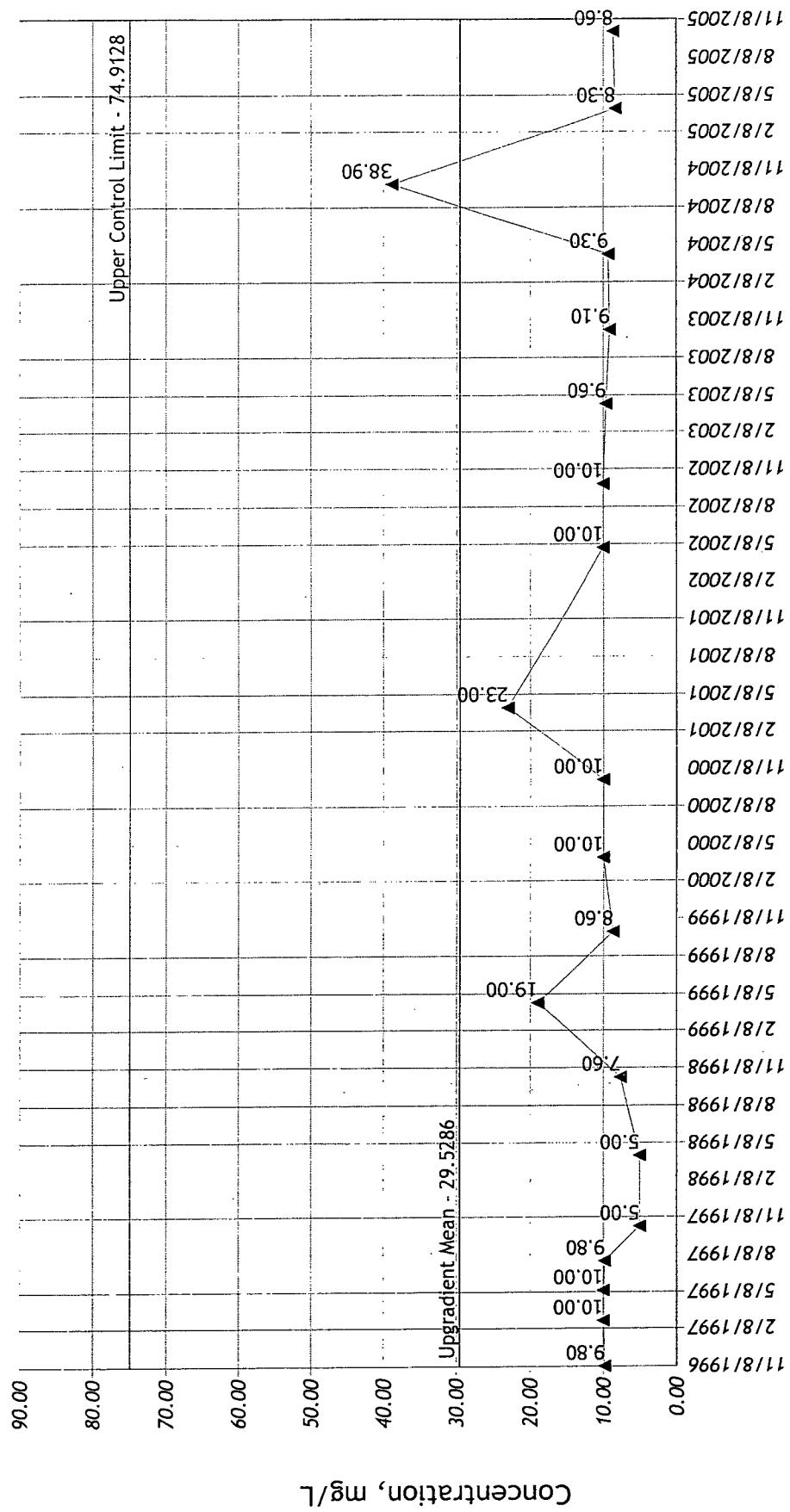
**23**

05001  
11/9/2005 11:53:17 AM

### Chemical Oxygen Demand Trends - (MW-11)

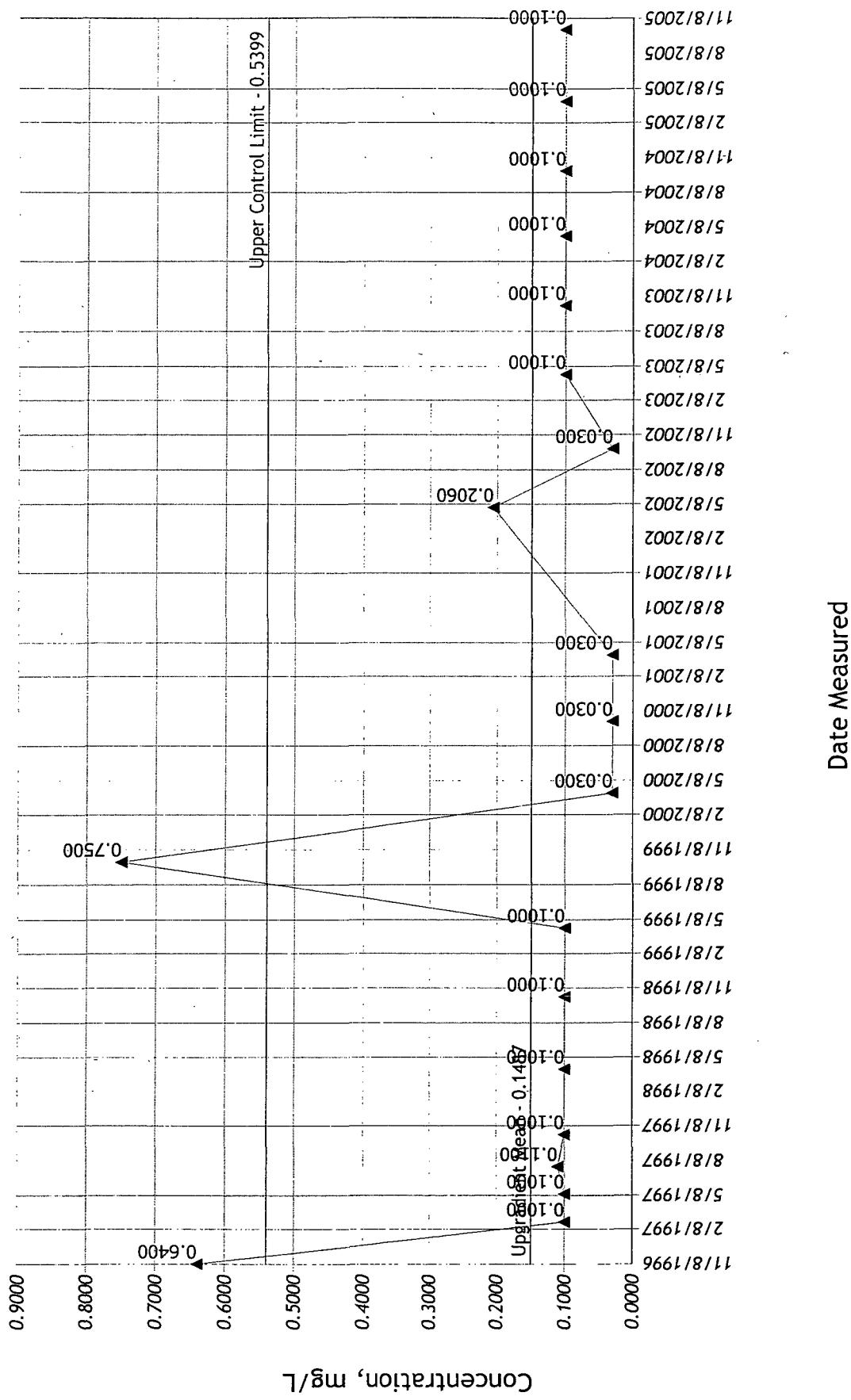


### **Chloride Trends - (MW-11)**



**Chloride  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89**

### Iron, Dissolved Trends - (MW-11)

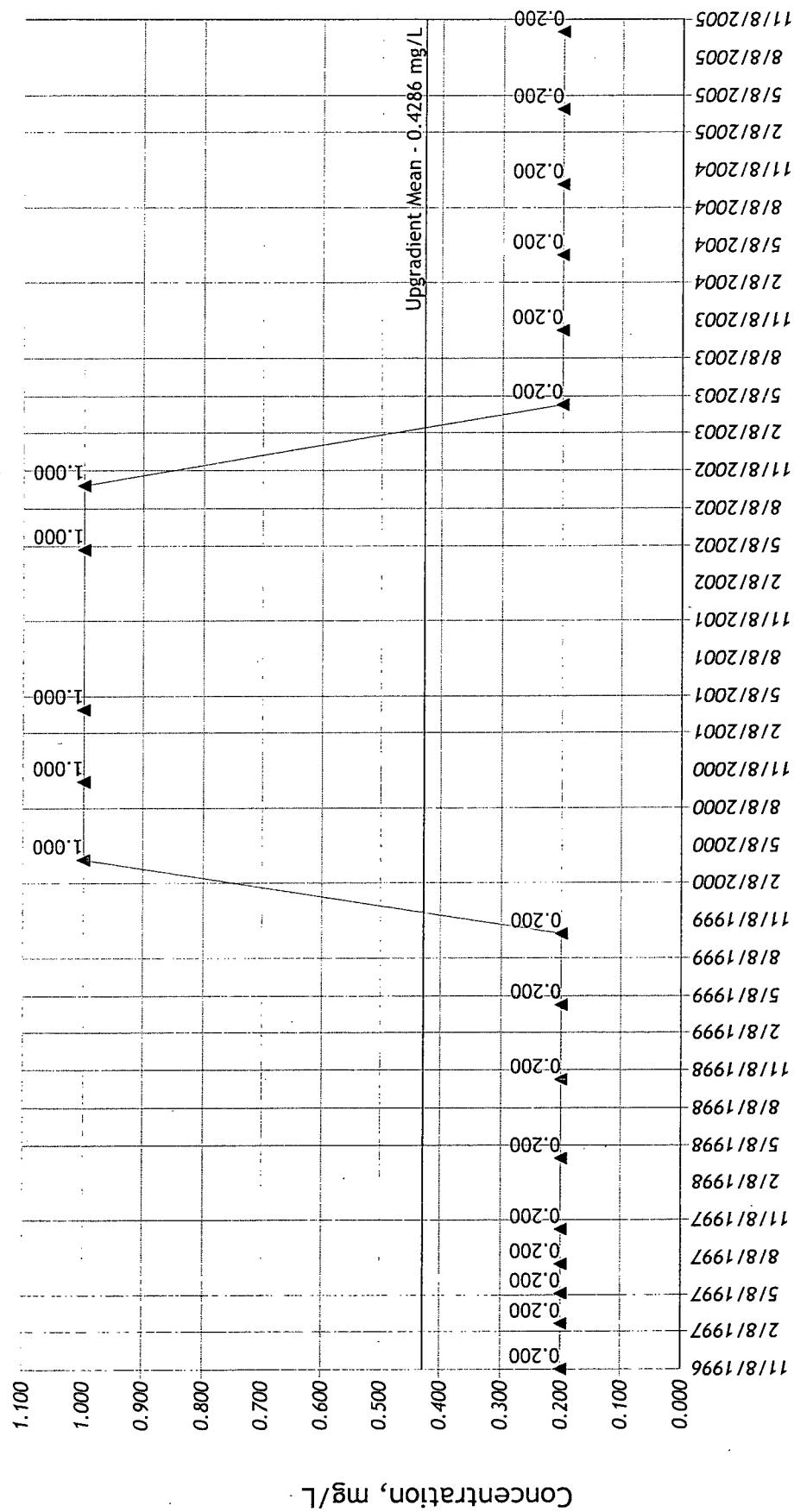


26

**Iron, Dissolved**  
**Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

05001  
11/9/2005 11:53:21 AM

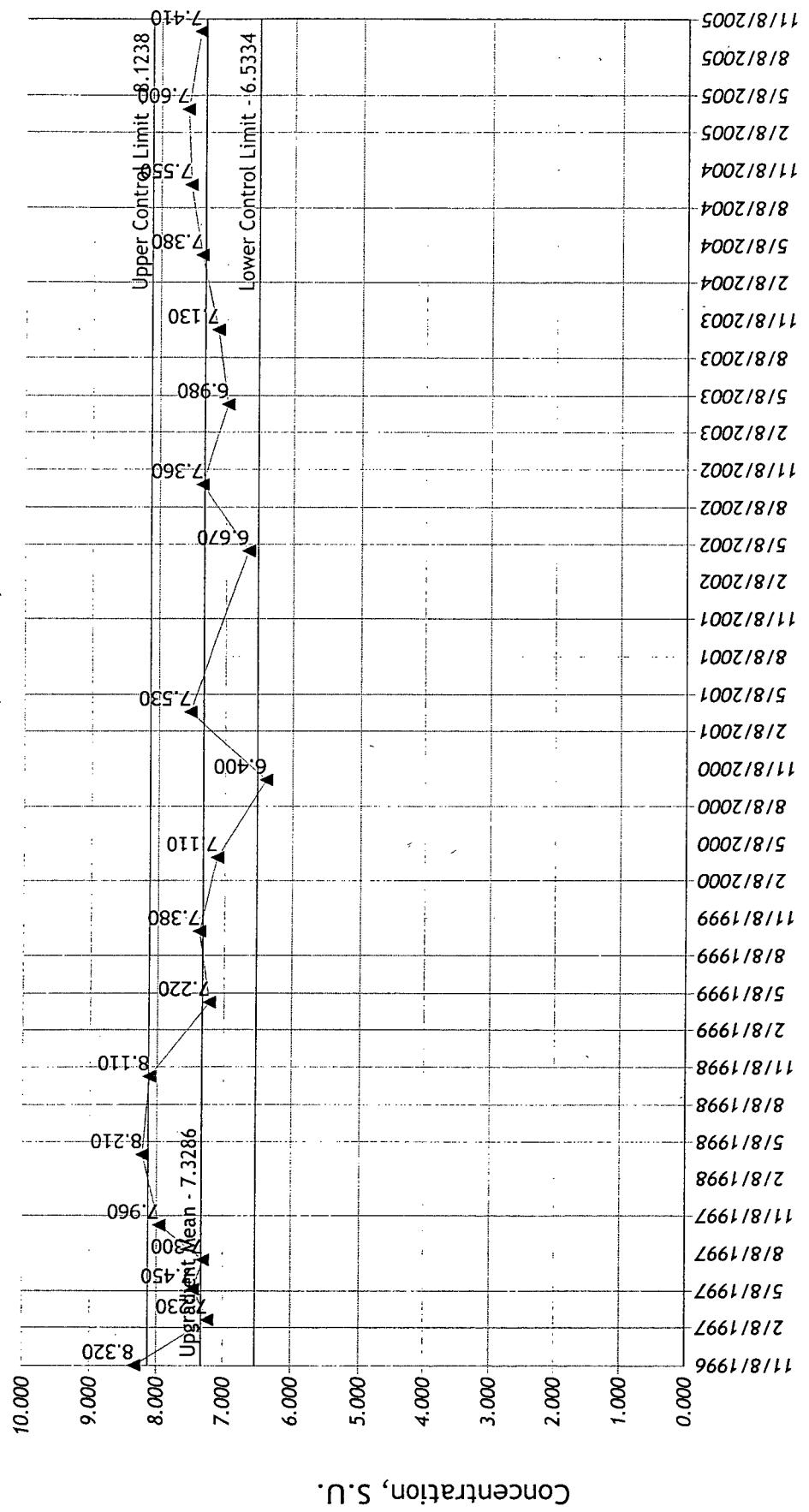
### Nitrogen, Ammonia Trends - (MW-11)



Note: The upper control limit is not shown as the standard deviation was not calculated due to consistent parameter non-detect in the up-gradient monitoring point.

**Nitrogen, Ammonia**  
**Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

### pH Trends - (MW-11)



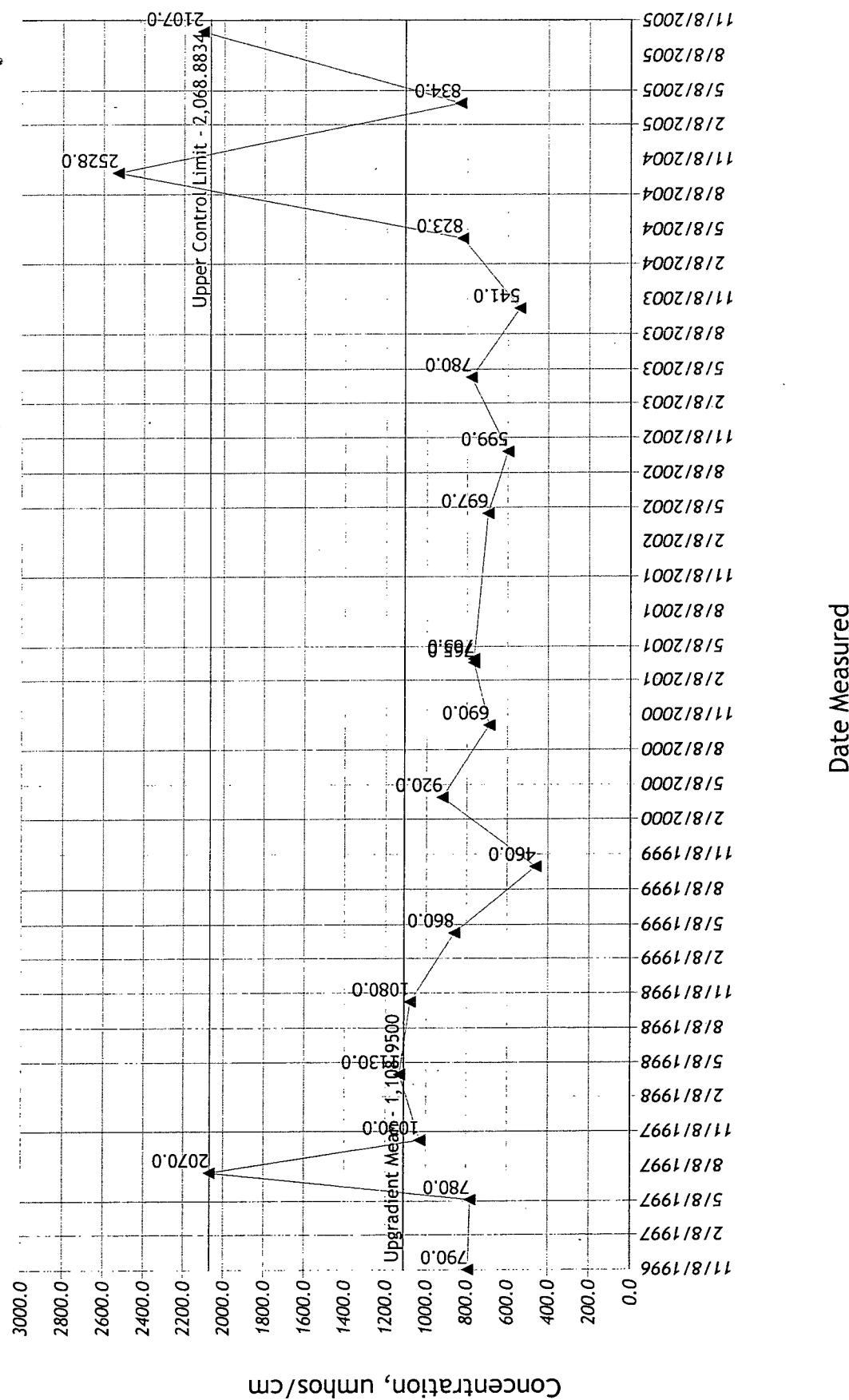
28

**pH**  
Council Bluffs Construction and Demolition Landfill

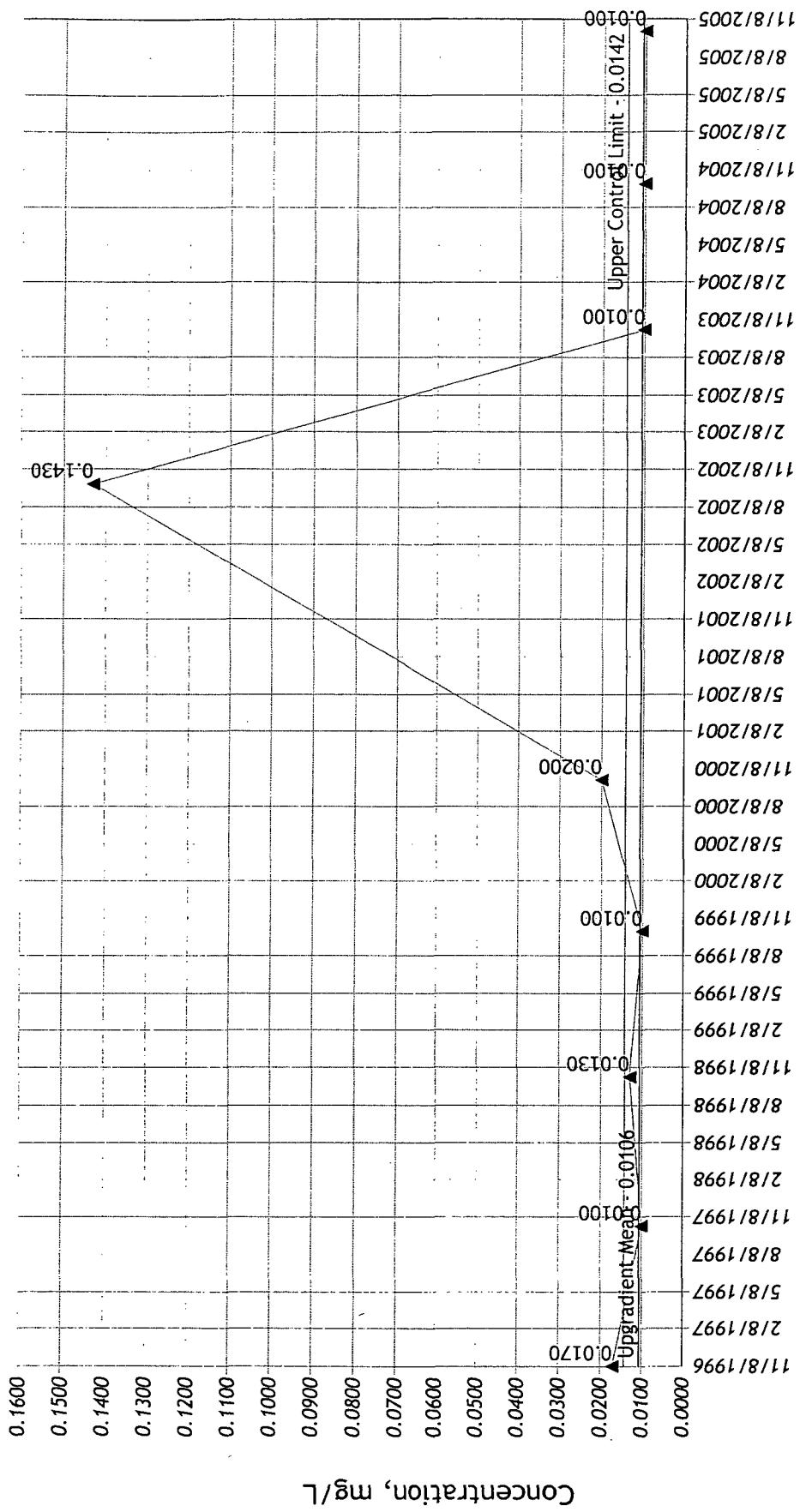
78-SDP-04-89

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11/9/2005 11:53:24 AM

### Specific Conductance Trends - (MW-11)



### Total Organic Halogens Trends - (MW-11)

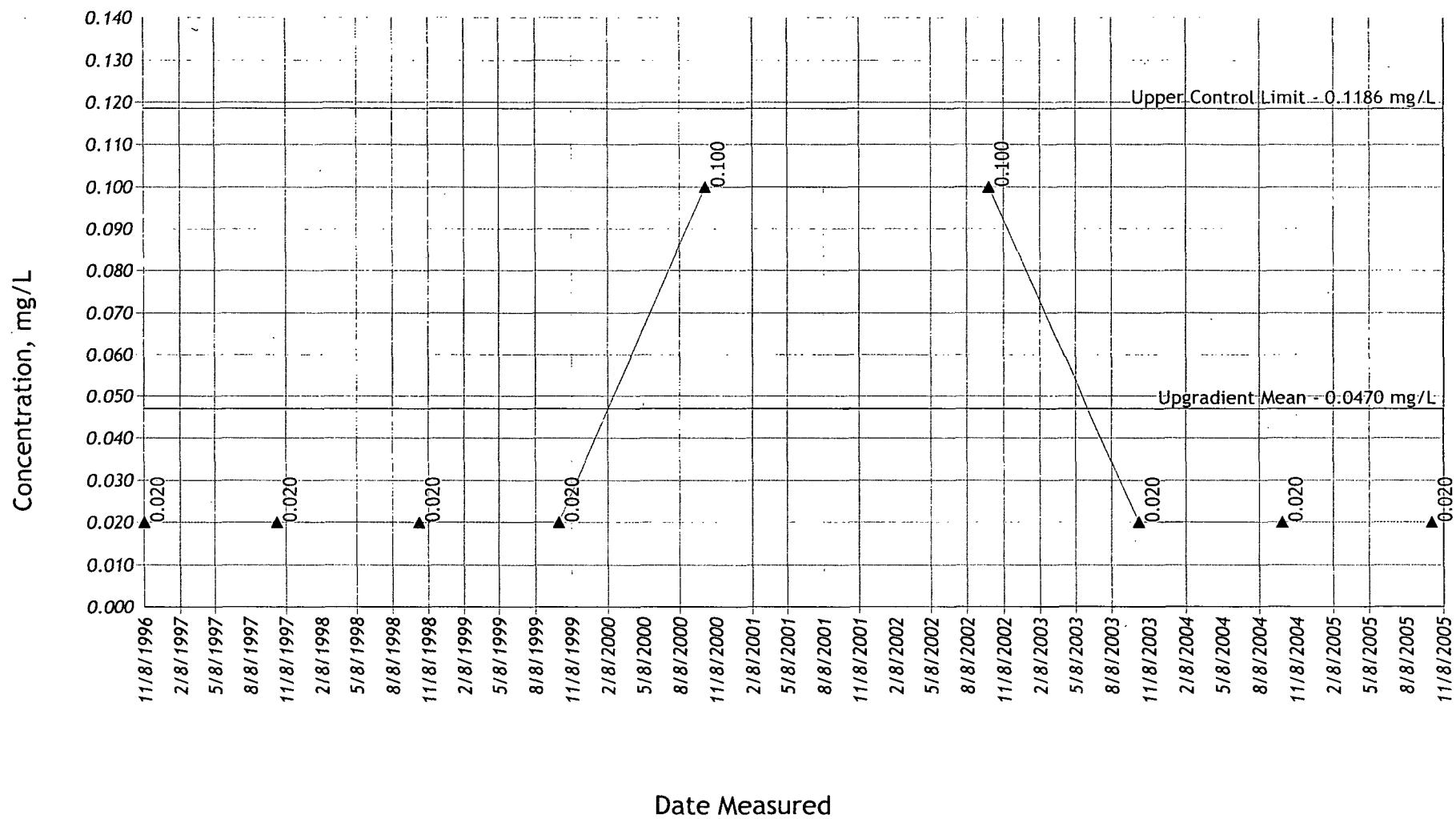


30

**Total Organic Halogens  
Council Bluffs Construction and Demolition Landfill  
78-SDP-04-89**

05001  
11/9/2005 11:53:26 AM

### Total Phenols Trends - (MW-11)



31

**Total Phenols**  
**Council Bluffs Construction and Demolition Landfill**  
78-SDP-04-89

05001  
11/9/2005 11:53:28 AM

**APPENDIX F**  
**LEACHATE CONTROL SYSTEM MONITORING SHEET**

Attn Christine

**2005**

**Leachate Control System Monitoring Sheet**  
**Anderson Excavating C&D Landfill**  
**Permit # 78-SDP-04-89P**

Leachate Tank Monitoring Date	Leachate Tank Capacity	Leachate Tank Level	Comments on Leachate
January	90%	1-14-05	Reinvention
February	70%		
March	10%		
April	15%		
May	60%		
June	30%		
July	85%	7-15-05	Rei.
August	25%		
September	80%		
October			
November			
December			

\* POTW (Publicly Owned Treatment Works) – Refer to permit for requirements